

Table of Contents

Chapter 1 – Purpose of and Need for Action	3
Purpose and Need for Action	13
Proposed Action (Plans of Operations as submitted by the Miners)	14
Decision Framework.....	17
Laws, Regulations, Policies, and Plans	17
Public Involvement	26
Issues	27
Chapter 2 - Alternatives	33
Alternatives Considered But Eliminated from Detailed Study	33
Alternatives Considered in Detail	34
Alternative 1 - No Action/No Change in Present Situation.....	34
Alternative 2 - Proposed Action (Plans of Operations as submitted by the Miners)	37
Alternative 3 – Plans of Operations as submitted by the Miners with Forest Service Requirements	65
Comparison of Alternatives	71
Preferred Alternative	72
Chapter 3 – Affected Environment and Environmental Effects	73
Cumulative Actions and Activities	73
Water and Soil Resources	81
Fisheries	143
Wildlife	190
Invasive Species	201
Botany	221
Access/Transportation System	233
Recreation	249
Visual Resources	273
Social and Economic.....	285
Cultural Resources.....	299
Other Required Disclosures	307
Chapter 4 Agencies and Persons Consulted	313
Recipients of the Draft Supplemental EIS	313
Index.....	317
References	319

Table of Maps

Map 1 - Vicinity	7
Map 2- Management Areas	9
Map 3 - Alternatives 2 and 3.....	63
Map 4 - Subwatershed, Major Streams, and Fish Distribution.....	145

Chapter 1 – Purpose of and Need for Action

Document Structure

The Forest Service has prepared this Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Impact Statement discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters:

Chapter 1. Purpose and Need for Action: This chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded, including issues generated by the public and from resource specialists.

Chapter 2. Alternatives, including the Proposed Action: This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on issues raised by the public and other agencies. This chapter is a mini-summary of the effects section, highlighting some of the impacts and associated calculations related to potential implementation. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

Chapter 3. Affected Environment and Environmental Consequences: This chapter describes the affected resource, followed by the environmental effects of implementing the proposed action and other alternatives on that resource. This chapter is organized by impacts generated by the alternatives on the issues, then on resource areas, then by individual operating plans. Key issues are addressed first.

Chapter 4. Consultation and Coordination: This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.

Appendices. The appendices provide more detailed information to support the analyses presented in the environmental impact statement.

Index. The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the office of the Whitman Ranger District, Baker City, Oregon.

This Draft Environmental Impact Statement (DEIS) for the Granite Creek Watershed Mining Plans (Granite Mining EIS) documents the site-specific direct, indirect, and cumulative environmental effects from authorizing the approval of proposed mining Plans of Operations (Plans) in the Granite Creek Watershed. The project area includes the entire Granite Creek Watershed (Wallowa-Whitman and Umatilla National Forests). Plans proposed in this document would be in effect from 2014 to 2024.

Location of Project Area

The Granite Creek Watershed (approximately 94,480 acres) is located in the Blue Mountains of eastern Oregon and is primarily within the administrative boundaries of the Whitman Ranger District, Wallowa-Whitman National Forest (40,624 acres), and the North Fork John Day Ranger District, Umatilla National Forest (49,539 acres). Approximately 4,150 acres in the watershed are privately held. The Granite Creek Watershed is located approximately 30 miles west of Baker City, in Baker County, Oregon, and 40 miles southeast of Ukiah, in Grant County, Oregon.

Approximately 167 acres of the Granite Creek Watershed are located within the administrative boundaries of the Malheur National Forest, however, none of the proposed activities or roads in this project is located within the Malheur National Forest, therefore, those 167 acres will not be included in the decision for this analysis.

The legal description for the watershed is:

Township 8 South, Range 34, 35, 35½ and 36 East

Township 9 South, Range 34, 35, 35½, and 36 East

Township 10 South, Range 34, 35, 35 ½, and 36 East, Willamette Meridian.

Granite Creek is a tributary to the North Fork John Day River, which is a tributary to the John Day River. Granite Creek originates near the North Fork John Day Wilderness on the Wallowa-Whitman National Forest.

Six HUC (Hydrologic Unit Code) 12 subwatersheds are included in the Granite Creek HUC 10 Watershed. Watershed and subwatershed numbers and subwatershed names have undergone two reviews since 1990 resulting in some changes in subwatershed boundaries, numbers and names. The first review and modification resulted in new numbers in 2005 and some new boundaries. This layer was updated in 2008. In 2009 the new changes were published with some updating in 2010. The result was changes in subwatershed names and small changes in boundaries. A crosswalk table is available in the project file which shows the changes that have occurred since 1990. The crosswalk table provides a way to utilize earlier reports that referenced the early subwatershed names and numbers.

For the Granite Creek Mining EIS, the 2010 National Hydrography Data (NHD) watershed and subwatershed names, numbers, and boundaries are used in this document and shown in Table 1-1.

Table 1-1: Project Area Subwatershed Acres (2010 NHD layer)

HUC 12 Subwatersheds of the Granite Creek Watershed			
Subwatershed Name and #	WWNF Acres	UNF Acres	Private/Other Acres
Upper Granite Creek #170702020201	7,138	2,003	173
Lower Granite Creek #170702020206	1,055	17,954	1,274
Clear Creek	1,562	17,682	Private: 1,057

HUC 12 Subwatersheds of the Granite Creek Watershed			
#170702020204			Malheur NF: 167
Lake Creek #170702020205	0	11,884	53
Beaver Creek #170702020203	12,104	16	958
Bull Run Creek #170702020202	18,765	0	635
TOTAL ACRES	40,624	49,539	4,317

Two claims, Hopeful 1 and Hopeful 2& 3, are partially located within the North Fork John Day (NFJD) Wilderness Area, but are not proposing any activities in that portion of their claims.

Other major features of the Granite Creek Watershed include an inactive range allotment (Camp Creek Cattle and Horse Allotment) the small towns of Granite and Greenhorn (known for their historic mining), and a moderate amount of dispersed recreation use.

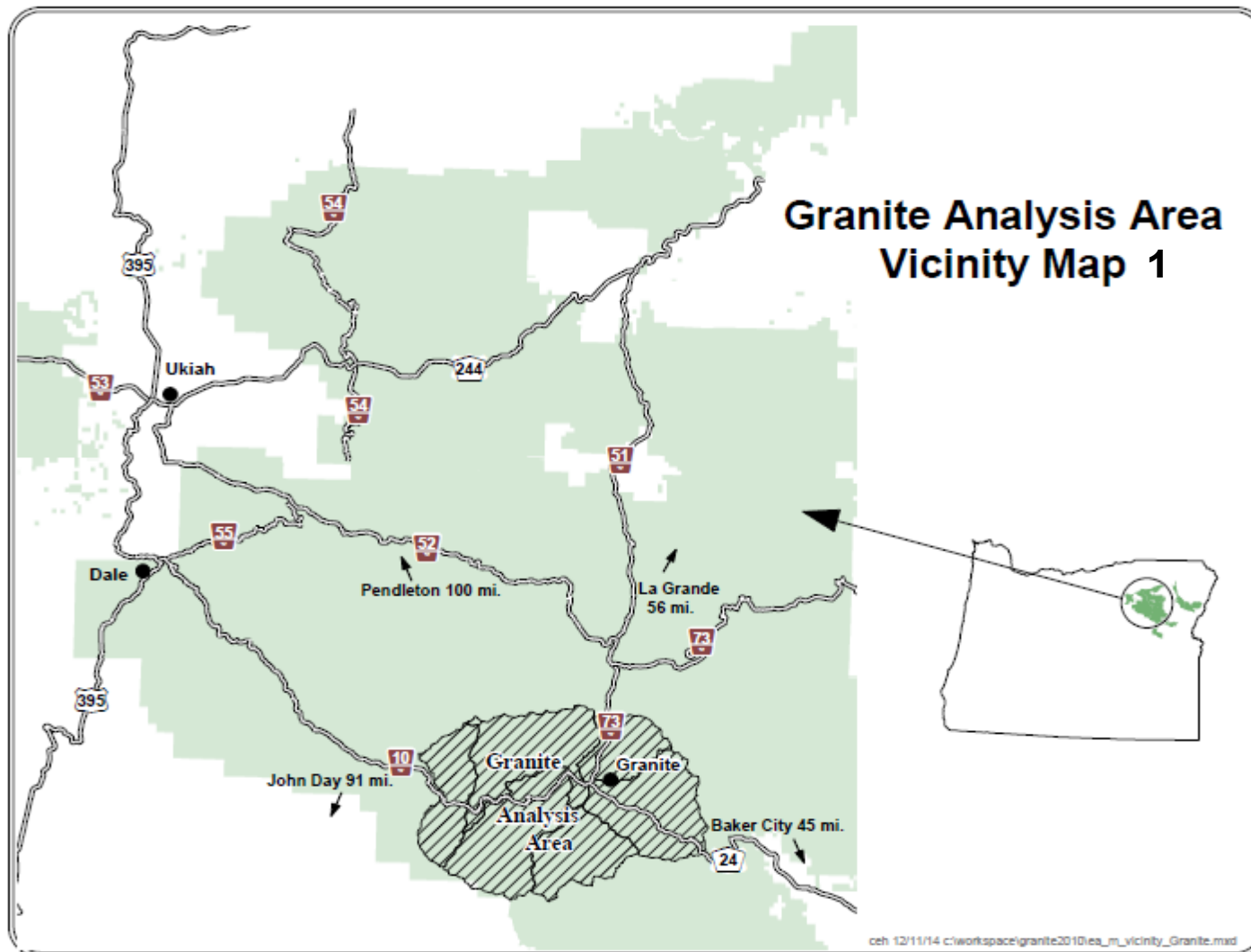
The Granite Creek Watershed includes the North Fork John Day Wilderness Area, the Greenhorn Mountain and Twin Mountain Roadless Areas, the Vinegar Hill Scenic Area, the Vinegar Hill Research Natural Area, a portion of the Elkhorn Scenic Byway, Olive Lake Recreation Area and the Historic Fremont Power House, and a small portion of the NFJD Wild and Scenic River (at the confluence of Granite Creek).

Table 1-2: Granite Creek Watershed Special Interest Areas

Special Interest Area	Acres in Project Area
Vinegar Hill	3229.5
Twin Mountain Roadless Area	2930.4
North Fork John Day Wilderness	25217.4
Greenhorn Mountain Roadless Area	2488.5
Special Fish Management Area	16241.6
Olive Lake - Fremont Powerhouse	1001.4
Vinegar Hill RNA	179.0
Greenhorn Historical Area	83.7
North Fork John Day Wild & Scenic River	1.6

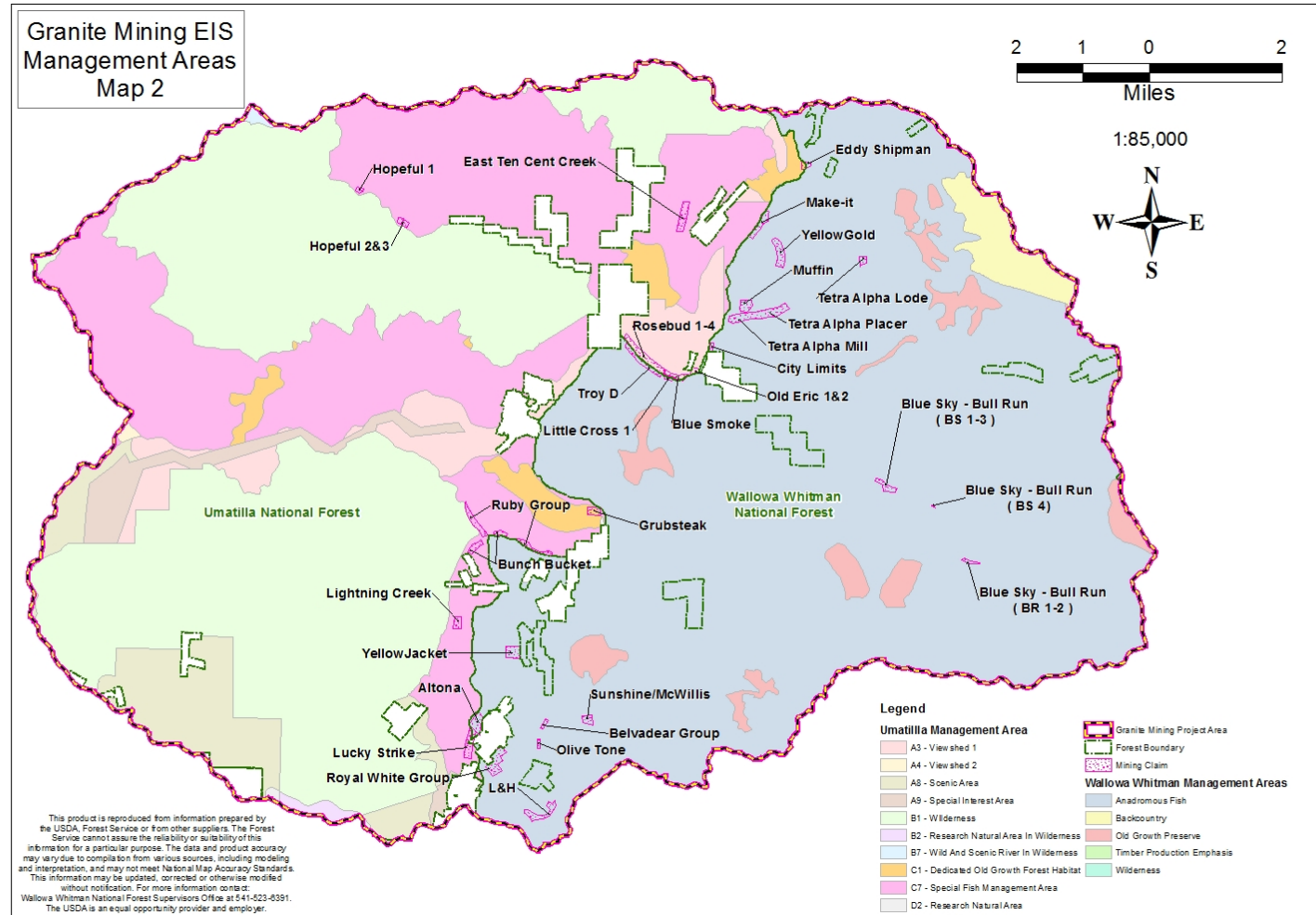
The maps on the following pages display the analysis area and management areas from the Umatilla and Wallowa-Whitman Forest Plans. A map displaying streams, fish habitat and subwatersheds in the analysis area can be found in the Fisheries section of Chapter 3.

This page intentionally left blank.



Map 1 - Vicinity

This page intentionally left blank.



Map 2- Management Areas

Background

The Oregon Department of Geology reports gold was discovered in Granite Creek in 1861 (project file). Initially gold production in this area was placer gold mined from the gravel and bars of streams. During the late 1860s and 1870s, mining districts were established as placer miners scattered about the territory. Counties had not yet been established, so the districts were used to keep track of specific claim locations. Vein deposits were discovered soon after the advent of placer mining. Quartz mines were worked as early as the 1870s in the Granite area. In the late 1880s, lode mining began to develop rapidly with the advent of equipment such as the pneumatic drill, the stamp mill for crushing ore, and new chemical methods to extract gold from its alloys. There were several major lode mines with over 100 feet of underground workings in the watershed. Mining operations such as Red Boy, Black Jack, Cougar, New York, Independence, La Bellview, and Eureka were established in the area by the early 1900s.

In 1938, the Porter Brothers dredge was built near Granite. During the next several years, portions of Granite, Bull Run, Clear and Olive creeks were dredged. Numerous rock piles, the result of the dredging operations, are still visible along these streams. These areas were again dredged in the 1950s by local residents with a “doodle bug” (bucket dredge). During the mining boom, several small towns such as Robinsonville, Lawton, Alamo and Wilsonville developed and then quickly disappeared. Granite and Greenhorn are still small communities inhabited by a mix of year-round and seasonal residents and visited by tourists. The Porter Brother’s dredge is currently on display in Sumpter, Oregon.

In 1942, War Production Board Order L-208 closed many precious metals mines, however mines in the Granite area were not shut down because the mining activity there was so minimal. Inflation and high gold prices in the early 1980s caused renewed interest in gold mining. Inflation and high gold prices in the early 1980s caused renewed interest in gold mining.

Current Mining

Today the most common placer equipment includes the use of hand tools and Oregon Department of Environmental Quality regulated equipment, such as small suction dredges and sluice boxes. In 2013, according to the Bureau of Land Management, there were approximately 225 registered claims in the Granite watershed. While some of these claims are associated with the Proposed Plans of Operations, the majority of these claims are for prospecting and future speculations. These claimants and non-claimed prospectors in the area have either not made their intents known or are operating within the guidelines established in Forest Service mining regulations 36 CFR 228.4.

According to the Department of Oregon Geology and Mineral Industries (DOGAMI) records (accessed June 4, 2012) only one private miner in the area (the private Buffalo mine) has proposed an operation large enough to file a permit with the state office to conduct mining. Permits are required for projects over 5 acres in size and/or moving over 5,000 yards a year. As of 2014 this operation is on hold pending court mitigation over bankruptcy.

Historic and Abandoned Mines

From local information, surveys, and the Department of Oregon Geology and Minerals Industries (DOGAMI), it is estimated that over 100 historic or abandoned mines exist in the Granite Creek

Watershed. Inventory and assessment of these mines is an ongoing project and occurs as funding allows.

Because of this watershed's historical and extensive mining activities, inventories were started to assess the status and condition of abandoned mines and to plan for reclamation actions. Part of this process is the use of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (1980 and amended in 1986). This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.

The CERCLA act provides a standard framework and recording process for the evaluation of areas in order to determine if there is a need for cleanup and, what the cleanup would entail. CERCLA funding was used for the initial pipe work on the Blue Bird and Black Jack mines to divert the waste water through the settling ponds. This act provides the funding for clean-up and remediation of these sites.

The only proposed Plan in the Granite Mining project that overlaps a site currently identified for investigation under the CERCLA Act is Eddy Shipman (Table 1-2). The investigation is funding dependent, therefore no specific date for initiating the investigation has been established. A full listing of sites identified for investigation under the CERCLA Act can be found in the project file.

Table 1-2: Past Mining Sites associated with Proposed Plans identified for Investigation

Past Mining Area	Reports	Location	Potential Hazards Recommended Action	Comments
Central	EE/CA*	T-08 / R-35½ / s23	Metal concentration near clean-up level in waste rock, tailings and soil. Provide on-site containment.	The lower central adit is adit A in the proposed Eddy Shipman plan. The other adits in this plan are upstream of this proposal.
New York Independence & East Eddy	SI**	T-08 / R-35½ s22, 23, 27	Elevated metals in waste rock, tailings and soil.	East Eddy and the west side of Eddy Shipman have the same adits.

*EE/CA – Engineering Evaluation/Cost Assessment – This is the final evaluation in the CERCLA process.

**SI – Site Investigation – This is a more detailed site evaluation, and involves a detailed sampling program to ascertain the contaminant of concern, the potential pathways, and the potential risks (human health and/or ecological).

For more information on these sites visit the Forest Service National web page at <http://www.fs.usda.gov/detail/umatilla/landmanagement/planning/?cid=stelprdb5208004> for the Umatilla and, <http://www.fs.usda.gov/detail/wallowa-whitman/landmanagement/projects/?cid=stelprdb5287229> for the Wallowa Whitman. Not all sites listed on these web pages are within the Granite watershed, so please refer to the above list when reviewing the information.

The Oregon State Department of Environmental Quality (ODEQ) maintains an Environmental Cleanup Site Information (ECSI) database to track sites in Oregon with known or potential contamination from hazardous substances, and to document sites where ODEQ has determined that no further action is required. This is working information used by ODEQ's Environmental Cleanup Section. Complete information can be found at <http://www.deq.state.or.us/lq/ecsi/ecsi.htm>. This site also contains some of the same information that can be found at the Forest Service web sites listed with Table 1-2. As with the CERCLA sites identified in Table 1-2, the only proposed plan that overlaps a site identified by ODEQ for investigation under the CERCLA Act is Eddy Shipman.

Purpose and Need for Action

Existing Condition

The 36 Code of Federal Regulations (CFR) 228.4 states that if a mine proposal is likely to cause significant disturbance of surface resources, the miner is required to submit a Plan of Operations (Plan) and according to 36 CFR 228.5 it will be analyzed by the authorized officer to determine the reasonableness of the requirements for surface resource protection. In the Granite Watershed, a number of mining Plans were previously approved in the early 1980s. Since then, environmental conditions have changed in this watershed, such as Endangered Species Act (ESA) fish were listed, requiring that the Plans address these changes. In addition to this, all of the Plans have either expired or completed their activities.

Two streams in the watershed (Bull Run Creek and Granite Creek) are currently listed as water-quality limited for sedimentation by the Oregon Department of Environmental Quality (DEQ) under section 303(d) of the Clean Water Act.

On July 10, 1998, Columbia River bull trout (*Salvelinus confluentus*) were listed as threatened under the Endangered Species Act (ESA). On May 24, 1999, Mid Columbia steelhead (*Oncorhynchus mykiss*) were listed as threatened under the ESA. Both of these species are found in streams located within the Granite Creek Watershed. Redband trout (*Oncorhynchus mykiss*), which exists in the watershed, has been added to the Regional Forester's list of sensitive species; and Columbia spotted frog (*Rana luteiventris*) has a documented population in the watershed and is on the Regional Forester's sensitive species list.

There are approximately two dozen locations for Region - 6 Sensitive *Botrychium* plant species located within the Granite Creek Watershed on both the Wallowa - Whitman and Umatilla National Forests. The sites are represented by the following species: *Botrychium crenulatum*, *B. montanum*, *B. minganense*, *B. lanceolatum*, *B. lunaria* and *B. pinnatum*.

Desired Condition

Desired conditions for the surface resources on the mining claims in the Granite Creek Watershed are derived from goals, objectives, standards, and guidelines from the Wallowa-Whitman and Umatilla National Forests Land and Resource Management Plans (Forest Plans), public scoping, and interdisciplinary team input. Desired conditions provide a future vision for the area and can

help in development of management options for the mining operations in the Granite Creek Watershed over time.

Twenty-eight Plans of Operations would be approved for the mining operations in the Granite Creek Watershed that include requirements and protection measures to ensure that adverse impacts to water quality and surface resources are minimized.

- Watershed values are protected to the fullest extent possible under existing laws in evaluating and developing mineral operating plans (*WWNF Forest Plan, page 4-25*).
- During development of operating plans or plan modifications, reasonable alternative mitigation measures and/or operating requirements will be developed to define the appropriate stipulations needed to protect other resources while still meeting the objectives of the minerals operator (miner). The test for operating plan requirements is “reasonableness” (*UNF Forest Plan, page 4-81*).

Purpose and Need

There is a need to authorize the approval of Plans of Operation submitted by the miners, as specified in 36 CFR 228.4(a), and to consider the Forest Service’s responsibility to approve or require modifications to these Plans in accordance with federal mining and environmental laws. As described above, previous Plans in the area were approved prior to the listing of the bull trout and steelhead as threatened. Because conditions have changed, previous plans expired and new plans have been submitted, there is a need to approve these plans, as specified in 36 CFR 228.4(e).

Based on the number and nature of mining operations in the drainage, the existence of two listed fish species, and the current water quality-limited status of two streams in the watershed, the responsible officials determined that potential significant environmental impacts may occur in the Granite Creek Watershed, and therefore an EIS is required to disclose those impacts in detail, to analyze alternatives to the proposals, and to determine possible means of mitigating those impacts.

This EIS analyzes the direct, indirect, and cumulative effects of mining operations and of management requirements designed to reduce adverse environmental effects from those operations.

Proposed Action (Plans of Operations as submitted by the Miners)

The Proposed Action would authorize the approval of 28 proposed Plans of Operations in the Granite Creek Watershed, as submitted by the miners. They are listed in Table 2-2 in Chapter 2.

Approval of the Plans as submitted would require that they meet all current legal and administrative requirements.

Summaries and photos of each proposed Plan can be found in Appendix 8. The actual Plans of Operations as submitted to the Forest Service can be found in the project file. Refer to Chapter 2, Alternative 2 for a detailed map of the proposed action.

Proposed Plan Activities Excluded from Analysis under 36 CFR 228.4

When addressing proposed Plans of Operations, some of the activities as described in the proposal do not require analysis or approval as they are exempted by 36CFR 228.4(a)(1) from the requirement to submit a Plan of Operations. Specifically:

- Operations limited to the use of vehicles on existing public road or roads used and maintained for National Forest System purposes.
- Prospecting or sampling a small amount of material generally removed by hand.
- Marking and monumenting a mining claim.
- Operations completely underground which will not cause significant surface resource disturbance.
- Operations /activities involving the disturbance of surface resource that are not substantially different than other forest users without special authorizations.
- Operations which will not involve the use of mechanized earthmoving equipment or the cutting of trees.

In a review of the Plans of Operations for the Granite Mining EIS, the following activities do not require approval thorough a Plan of Operations. The miners were notified that approval was not needed at this time for these proposed and specific mining activities. (see project file for the *Determination of Significant Surface Resource Disturbance* for this analysis).

- **Camping or seasonal occupancy incidental to mining** when described in the Plan of Operations as portable temporary quarters such as a travel trailer or similar equipment typically used by recreationists on the national forest. This type of temporary or seasonal occupancy would be similar to the public's cumulative summer use of an area, on the National Forest area, for which the public would not be required to obtain special use authorization, contract, or other written authorization (36 CFR 228.4 (a) (1) (v)). Alternatively, any camping or occupancy that might cause a significant disturbance of surface resources, such as extensive or year-round occupancy, improper disposal of refuse, poor sanitation practices, soil compaction, or loss of vegetation in a riparian area, were not exempted.
- **Prospecting, pick and shovel work, handwork** for sampling activity when described in the Plan of Operations as only removing a reasonable amount of mineral deposit for analysis and study. Based on past experience for the proposed locations and the National Forest resources involved, these types of activities are not likely to cause a significant disturbance of resource resources.

As noted above, these determinations relied on a combination of past experience, direct evidence, and sound scientific projection. The ranger districts' minerals program managers supplied site inspections from past mining operations documented annually for all known mining operations on the district. Hundreds of mining inspections were documented and summarized for the last 4

years on both forests, documenting any surface disturbances. Notes were also included regarding effects from camping, and work with hand tools, and no significant disturbance of surface resources were noted.

The list below shows the Plans of Operation submitted for the Granite Creek Watershed and the specific proposed mining activities that were included in the Plans and now exempted from Forest Service authorization or approval and NEPA analysis as a result of the information and findings/determinations (project file).

Table 1-3: Proposed Activities Excluded from NEPA Analysis

Proposed Mining Operation	Camping	Prospecting Pick & Shovel work/Handwork
Altona	-	Yes
Belvadear	-	Yes
Blue Sky/Bullrun	Yes	Yes
Blue Smoke	-	Yes
Bunch Bucket	Yes	Yes
City Limits	Yes	Yes
East Ten Cent Creek	-	Yes
Eddy Shipman	-	Yes
Grubsteak	Yes	Yes
Hopeful 1	-	Yes
Hopeful 2&3	-	Yes
L&H Placer	Yes	Yes
Lightning Creek	-	Yes
Little Cross 1	-	Yes
Lucky Strike	-	Yes
Make it	Yes	Yes
Muffin Placer	Yes	Yes
Old Erick 1&2	Yes	Yes
Olive Tone	Yes	Yes
Rosebud 1-4	Yes	Yes
Royal White	-	Yes
Ruby Group	-	Yes
Sunshine Group	-	Yes
Tetra Alpha Placer	Yes	Yes
Tetra Alpha Mill & Lode	Yes	Yes (Lode)
Troy D	Yes	Yes
Yellow Gold	Yes	Yes
Yellow Jacket 1, 2, 3	-	Yes

Source: USDA FS 2014.05.14. [This table was created from the information provided in the proposed plan of operation, and the home location of the miner for that proposal.]

After reviewing the Plans for the above listed proposed mining operations, and taking into consideration the activities that do not cause a significant disturbance of surface resources, the Whitman and North Fork John Day District Rangers concluded the remaining activities outlined in each Plan would result in impacts to NFS lands that can be avoided or ameliorated by means such as reclamation bonding, timing restrictions, or other mitigation measures to minimize adverse environmental impacts to NFS resources. Based on past experience, direct evidence, and sound scientific projection, each of these activities meet the definitions of 36 CFR 228.4 as Plan

of Operation activities require a NEPA decision and Plan of Operations approval. They are included in the Proposed Action and require a NEPA decision.

Decision Framework

The District Rangers of the Whitman Ranger District of the Wallowa-Whitman National Forest and the North Fork John Day Ranger District of the Umatilla National Forest are the Responsible Officials for review, analysis, and selecting an alternative from the choices in the Final Environmental Impact Statement (FEIS). The Responsible Officials' decision is documented in a Record of Decision (ROD). In the ROD, the Responsible Officials may decide to:

1. Adopt the No Action/No Change Alternative (Alternative 1).
2. Authorize the approval of the Plans of Operations as submitted by the miners (Alternative 2).
3. Approve the Plans of Operations with additional Forest Service site-specific Protection Measures and General Requirements (Alternative 3).

Decisions based on this analysis will meet Forest Plan standards and guidelines, and other applicable laws, regulations and policies. The potential effects described in Chapter 3 would not prevent current or potential opportunities to conduct minerals, energy, or special use activities in this area. The alternatives would not affect how current State and BLM regulations and law regulate or view the minerals, energy or special uses in the area.

Once the ROD is signed and issued, reclamation bonds and any 401 certifications and valid water rights determined necessary as a result of this analysis will be required before the Plans of Operations are approved and prior to commencement of mining activities (FSH 2817.23a (1)) .

The 401 certification is granted by the state of Oregon and allows for a discharge of pollutants (sediment, heavy metals, warm water, chemicals, etc.) into waters of the state, and ensures compliance with section 401 of the Clean Water Act (CWA)

Valid water rights are issued by the Oregon Water Resources Department, and will be required for activities requiring withdrawing water from a creek in which the withdrawal has the potential to locally increase stream temperatures. This will ensure compliance with the Oregon Department of Environmental Quality John Day River Basin Total Maximum Daily Load/Water Quality Plan (ODEQ John Day River Basin TMDL/WQP).

Laws, Regulations, Policies, and Plans

This analysis tiers to the 1990 Wallowa-Whitman National Forest Land and Resource Management Plan as amended (WWNF Forest Plan), Final Environmental Impact Statement (FEIS) and Record of Decision (ROD); the Umatilla National Forest Land and Resource Management Plan as amended (UNF Forest Plan), FEIS and ROD; The 1990 North Fork John Day Motorized Access and Travel Management Program (NFJD TMP) Environmental

Assessment (EA) and Decision Notice/Finding of no Significant Issues (DN/FONSI); the 2005 Pacific Northwest Region Invasive Plant Program ROD; the 2010 WWNF Invasive Plants Treatment Project FEIS and ROD; and the 2010 UNF Invasive Plant FEIS and ROD.

Mining and Claim Management

Many laws, regulations, policies, and plans direct the Forest Service to support and facilitate mineral extraction while protecting surface resources to the extent possible. The direction in these laws, regulations, policies and plans is incorporated by reference in this analysis.

The **1872 Mining Law** states that all valuable mineral deposits in land belonging to the United States are to be free and open to exploration. Under this law, a mine locator “shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations and of all veins, lodes, and ledges throughout the entire depth.”

The **Organic Administration Act of 1897** grants authority to the Forest Service to regulate surface resources of National Forest System lands.

The **Multiple Use Mining Act of 1955** directs that any mining claim located after July 23, 1955 shall not be used, prior to issuance of patent, for any purposes other than prospecting, mining or processing operations and uses reasonable incident thereto, and that such claims shall be subject to the right of the United States to manage and dispose of the vegetative surface resources thereof and to manage other surface resources thereof, and right of the United States, its permittees, and licenses, to use so much of the surface thereof as may be necessary for such purposes or for access to adjacent land.

The **Mining and Mineral Policy Act of 1970** directs the Federal Government to foster and encourage private enterprise in the development of economically sound and stable industries, and in the orderly and economic development of domestic resources to help assure satisfaction of industrial, security, and environmental needs.

The **National Forest Management Act of 1976 (NFMA)** recognizes the fundamental need to protect and, where appropriate, improve the quality of soil, water, and air resources. The Act also recognizes the interrelationships between and interdependence within renewable resources.

The **Federal Land Policy and Management Act of 1976 (FLPMA)** states that public lands will be managed recognizing the need for domestic sources of minerals.

The **Surface Mining Control and Reclamation Act of 1977 (SMCRA)** supplements state regulations, requires restoration of mined land to premining condition and prohibits mining where mandated restoration would not be possible. SMCRA specifically calls for the restoration and, if possible, enhancement of fish and wildlife habitat, which, coincides with requirements of both the Multiple-Use Sustained Yield and Federal Land Policy and Management Acts.

The **Forest Service Surface Use Regulations (36 CFR Part 228, Subpart A)** – also known as the 228 Regulations) set forth rules and procedures for use of the surface of National Forest System lands in connection with mineral operations. The regulations direct the Forest Service to prepare the appropriate level of NEPA analysis and documentation when proposed operations

may significantly affect surface resources. These regulations do not allow the Forest Service to deny entry or preempt the miners' statutory right granted under the 1872 Mining Law. The regulations require the Forest Service to develop measures to minimize adverse impacts on National Forest resources. The 228 regulations include requirements for reclamation.

The **Forest Service Manual (FSM) 2800** discusses specific responsibilities and considerations for dealing with Plans of Operations. It states that the Forest Service should minimize or prevent adverse impacts related or incidental to mining by imposing reasonable conditions that do not materially interfere with operations. It also requires the Forest Service to evaluate proposals for road construction and reconstruction and consider alternatives that may be less damaging to surface resources (*FSM 2817.25*).

The Forest Service direction also includes the **National Environmental Policy Act of 1970** (*42 U.S.C. 4332*), the **Council of Environmental Quality regulations (CEQ) at 36 CFR 800**; the **Federal Water Pollution Control Act (Clean Water Act)**; and the **Clean Air Act** as amended.

The Mining Law Administration program is managed by the Bureau of Land Management (BLM) as authorized by the Secretary of the Interior, and involves recordation, maintenance (annual assessment requirements), and mineral patents. Joint administration of the mining laws on National Forest Systems lands is provided for in a Memorandum of Understanding (MOU) between the BLM and Forest Service. The purpose of the MOU is to ensure coordination between the general surface resource management of the Forest Service and the administration of the mining laws by the BLM.

2012 National Best Management Practices (BMPs) for Water Quality is a standardized National BMP Program initiated in 2012 that integrated individual State and Forest Service regional BMPs under one umbrella to facilitate an agency-wide BMP monitoring program. The national core set provides general, non-prescriptive BMPs for the broad range of activities that occur on NFS lands. Nearly every BMP in the national core set of BMPs already exists in current regulations, guidance, or procedures. They do not change the substance of site-specific BMP prescriptions. This standardization is intended to improved consistency, and to ensure that Forest Service professionals use best available science to develop site-specific BMP prescriptions, and ultimately, improve water quality on and downstream of NFS lands. This analysis incorporates by reference these 2012 National BMPs.

The site-specific water resource protection measures (Appendix 1A), fish protection measures (Chapter 2), and General Requirements (Appendix 2), included in the Granite Creek Watershed Mining EIS meet the guidelines and intent of the 2012 BMPs.

The Treaty of 1855 is a treaty with the Walla Walla, Cayuse and Umatilla Tribes, 12 Stat. 945, signed June 9, 1855, ratified March 8, 1859.

Water Rights

The miners have the responsibility of working with the Forest Service and State Water Resources Department to obtain valid water rights or develop other acceptable means for obtaining the water necessary to support their operations. The Forest Service makes the decision to approve or not

approve the proposed Plan of Operations, but it is the miner's responsibility to secure whatever other State or Federal agency permits they require.

Several options exist for miners without a valid water right to obtain the water necessary for proposed operations. If surface water is fully or over-appropriated for a given stream, as determined by the Oregon Water Resources Department, the miner may be able to obtain water from a user with legal rights through the transfer process. It may also be possible for the miner to obtain exempt ground water for operations (small groundwater uses are exempt from the requirement to obtain a water right). This would be accomplished by constructing an off-channel pond or pit for which groundwater would be the only source. The miner also has the option of trucking water to the site from another source as approved by the Forest Service .

Unpatented Mining Claims

An unpatented mining claim is a claim to the locatable minerals as described in 36 CFR 228.4. Its location must be based on the discovery of these locatable minerals, and the law of *pedis possessio* (establishes a right by possession that allows the exclusive right to remove of minerals from a claim) allows for exploratory activities on mining claims in the diligent effort to perfect the claims by making a discovery on each as defined under the mining law. Thus, a claim properly located and diligently worked provides a protection on the miner's investments from appropriation by other miners, and provides the rights of the miner to work his or her recorded claim with the intent of perfecting the claim. To operate on a mining claim, the claimant must comply with all Federal and State laws and regulations.

Wallowa-Whitman and Umatilla National Forest Plans

The 1990 Wallowa-Whitman Forest Plan goals for minerals are:

- To provide for exploration, development, and production of a variety of minerals on the Forest in coordination with other resource objectives, environmental considerations, and mining laws.
- To encourage and assist, whenever possible, in the continuation of regional geologic mapping and mineral resource studies on the Forest in cooperation with other natural resource agencies.

The 1990 Umatilla Forest Plan goals for minerals are:

- To provide for exploration, development, and production of a variety of minerals on the Forest in consistent with various resource objectives, environmental quality and cost efficiency(pg. 4-3 # 19).
- The WWNF and UNF Forest Plans were amended in 1995 to include PACFISH. The PACFISH Standards and Guidelines for Minerals Management relevant to the Granite Mining project are: (*PACFISH Screens Information Guide, WWNF, 1995, pages 10-11*)
 - PACFISH MM-1: Avoid adverse effects to listed species and designated critical habitat from mineral operations. If the Notice of Intent indicates that a mineral operation would be located in a Riparian Habitat Conservation Area or could affect attainment of Riparian management Objectives, or adversely affect listed anadromous fish, require a reclamation plan, approved Plan of Operations (or other such governing document), and reclamation bond. For effects that cannot be avoided, such plans and bonds must address the costs of removing facilities,

equipment, and materials; recontouring disturbed areas to near pre-mining topography; isolating and neutralizing or removing toxic or potentially toxic materials; salvage and replacement of topsoil; and seedbed preparation and revegetation to attain Riparian Management Objectives and avoid adverse effects on listed anadromous fish. Ensure Reclamation Plans contain measurable attainment and bond release criteria for each reclamation activity.

WO Direction regarding PACFISH MM-1, March 6, 2002 (project file):

1. “The MM-1 standard and guideline applies only when the proposed activity is likely to cause significant surface disturbance.”
2. “To apply this standard and guideline to activities not meeting the “likely cause significant surface disturbance” test (in the 36 CFR 228 Regulations), is not appropriate, and is contrary to law and regulation.”

- PACFISH MM-2: Locate structures, support facilities, and roads outside Riparian Habitat Conservation Areas. Where no alternative to citing facilities in Riparian Habitat Conservation Areas exists, construct the facilities in ways that avoid impacts to Riparian Habitat Conservation Areas and streams and adverse effects on listed anadromous fish and inland native fish. Where no alternative to road construction exists, keep roads to the minimum necessary for the approved mineral activity. Close, obliterate and revegetate roads no longer required for mineral or land management activities.
- PACFISH MM-3: Prohibit solid and sanitary waste facilities in Riparian Habitat Conservation Areas. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in Riparian Habitat Conservation Areas exists, and releases can be prevented and stability can be ensured, then:
 - a. Analyze the waste material using the best conventional sampling methods and analytic techniques to determine its chemical and physical stability characteristics.
 - b. Locate and design the waste facilities using the best conventional techniques to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, prohibit such facilities in Riparian Habitat Conservation Areas.
 - c. Monitor waste and waste facilities to confirm predictions of chemical and physical stability, and make adjustments to operations as needed to avoid adverse effects to listed anadromous fish and inland native fish, and to attain Riparian Management Objectives.
 - d. Reclaim and monitor waste facilities to assure chemical and physical stability and revegetation to avoid adverse effects to listed anadromous fish and inland native fish and to attain the Riparian Management Objectives.
 - e. Require reclamation bonds adequate to ensure long-term chemical and physical stability and successful revegetation of mine waste facilities.
- PACFISH MM-6: Develop inspection, monitoring, and reporting requirements for mineral activities. Evaluate and apply the results of inspection and monitoring to modify mineral plans, leases, or permits as needed to eliminate

impacts that prevent attainment of Riparian Management Objectives and avoid adverse effects on listed anadromous fish and inland native fish.

WWNF Management Direction in the Granite Creek Watershed

The WWNF Forest Plan includes the following Minerals Standards and Guidelines (*WWNF Forest Plan, Chapter 4, page 4-33*):

1. Access. Permit claimants reasonable access to their claims as specified in the United States Mining Laws.
2. Operating Plans. Require operating plans in accordance with 36 CFR 228 Subpart A when operations are proposed, which involve significant disturbance of the surface resources.
3. Operating plans will include reasonable and operationally, feasible requirements to minimize adverse environmental impacts on surface resources.
4. Analyze operating plan proposals and alternatives, including alternatives for access, reclamation, and mitigation, using Forest Service NEPA process.
5. Reclamation. Develop reclamation standards using an interdisciplinary process to ensure lands are in productive condition to the extent reasonable and operationally feasible. Reasonable opportunities to enhance other resources will be considered. Concurrent reclamation will be stressed. Reclamation bonds will be based on actual reclamation costs and formulated using technical and other resource input.
6. Withdrawals. Review all existing withdrawals by 1991 in accord with Section 204(1) of the Federal Land Policy and Management Act (FLPMA) of 1976, except as provided otherwise by law.
7. Recommend areas with mineral potential for mineral withdrawal only when mitigation measures would not adequately protect other resource values, which are of greater public benefit.
8. Conform to Section 204 of FLPMA in withdrawals from entry under general mining laws.
9. Common Minerals. Give priority to use of currently developed common mineral (natural gravel and hard rock) material sources over undeveloped sources. Exceptions will be made when existing sources are unable to economically supply the quality and quantity of material needed or when conflicts with other resource uses are found to be unacceptable.
10. Development of mineral material sites will be done in accordance with 36 CFR 228, Subpart C.

WWNF Forest Plan Management Areas (MA) within the watershed are (*WWNF Forest Plan, Chapter 4*):

MA 1 – 48 acres – Timber Emphasis

Management emphasizes wood fiber production on suitable timberlands while providing relatively high levels of forage and recreational opportunities. Forest-wide minerals standards and

guidelines apply. The Forest Plan recommends that open road densities be 2.5 miles per square mile (mi/mi²).

MA 4 -6 acres - Wilderness

The intent is to preserve the wilderness qualities of these areas. These areas will be managed in accordance with the Wilderness Act of 1964, P.L. 94-199, the Oregon Wilderness Act of 1984, and the 2320 section of the Forest Service Manual. Designated wilderness is withdrawn from further mineral entry, but mining on valid claims that existed prior to December 31, 1983, or establishment of the wilderness (whichever is later) may continue. No existing plans of operations are approved in this management area.

MA 6 – 984 acres – Backcountry

Management emphasizes opportunities for those dispersed recreation activities usually recognized within the relatively high elevation areas (upper forest, subalpine, or alpine areas). Extra emphasis is placed on minimizing surface resource impacts from mining, and on high standard reclamation.

MA 15 – 1,646 acres - Old Growth Preserve

These areas are intended to maintain habitat diversity, preserve aesthetic values, and to provide old-growth habitat for wildlife. Forest-wide minerals standards and guidelines apply, with the additional guideline to avoid disturbance to the extent practical. If old-growth stands are lost due to mining activities, replacement stands will be selected.

MA 18 – 37,445 acres - Anadromous Fish Emphasis

This area is intended to achieve and maintain optimum conditions for anadromous fish and provide near-optimum conditions for big game. Emphasis is placed on providing anadromous fish habitat at, or near, the maximum potential of the watershed where this area is applied. In most instances, it is expected that near-optimum habitat for big game can be provided simultaneously with anadromous fish habitat. Providing quality fish habitat takes priority over big-game habitat where conflicts occur. Emphasis is placed on protecting fish habitat and habitat investments through reasonable provisions in plans of operation and in reclamation requirements.

UNF Management Direction in the Granite Creek Watershed

The UNF Forest Plan includes the following Minerals Standards and Guidelines (*UNF Forest Plan, page 4-81*):

1. Mineral exploration and mineral removal are permitted throughout the Forest except in withdrawn areas.
2. Under the mining laws, claimants are entitled to access to their mining claims. Access for exploration and development of locatable mineral resources will be analyzed in response to a proposed operating plan. A decision on approval of reasonable access will be made as a result of appropriate environmental analysis.
3. When claimants propose mining activities which involve disturbance of the surface resources, a notice of intent and/or a proposed plan of operation must be submitted. The proposal will be processed in a timely manner in accordance with 36 CFR 228.
4. During development of operating plans or plan modifications. Reasonable alternative mitigation measures and/or operating requirements will be developed to define the

- appropriate stipulations needed to protect other resources while still meeting the objectives of the mineral miner. The test for operating plan requirements is 'reasonableness.'
5. Reclamation standards will be developed using an interdisciplinary process to insure land restoration to a productive condition to the extent reasonable and practicable. When reasonable, opportunities to enhance other resources will be considered. Concurrent reclamation will be stressed. Reclamation bonds will be based on actual reclamation costs.
 6. Claims on which application for patent have been made will be examined and conclusion of validity will be presented to the BLM for final action.

UNF Forest Plan Management Areas (MA) within the watershed are (*UNF Forest Plan, Chapter 4*) :

MA A3 – 2,646 acres – Viewshed 1:

Description: The strategy applies to all or parts of the defined Sensitivity Level 1 travel routes, use areas, or water bodies. Sensitivity levels are defined in the Umatilla National Forest landscape management text, and viewshed boundaries are defined on the Forest Visual Quality Objective (VQO) maps.

Minerals and Energy direction: Meet the visual quality objectives within the intent of the Forest-wide Standards and Guidelines for minerals and energy. Utilize existing access routes to developments where possible. Provide for reclamation on completion of all projects within the viewshed corridors.

MA A4 – 40 acres – Viewshed 2:

Description: The strategy applies to all or parts of the defined Sensitivity Level 2 travel routes, use areas, or water bodies. Sensitivity levels are defined in the Umatilla National Forest landscape management text, and viewshed boundaries are defined on the Forest Visual Quality Objective (VQO) maps.

Minerals and Energy direction: Meet the visual quality objectives within the intent of the Forest-wide Standards and Guidelines for minerals and energy. Utilize existing access routes to developments where possible. Provide for reclamation on completion of all projects within the viewshed corridors.

MA A8 – 3,028 acres – Scenic Area

Description: Scenic areas are areas of natural variety where unique physical characteristics give viewing pleasure and dispersed recreation opportunities to the forest user. The strategy applies to all or part of the current scenic areas and other identified selected forest areas with high scenic values.

Minerals and Energy direction: Meet Forest-wide Standards and Guidelines. Operating plans are to include reasonable, operationally feasible requirements to meet scenic area objectives.

MA A9 – 1,085 acres - Special Interest Area

Description: Several unique areas (generally small in size) have been identified for their special features. The areas may be classified under 36 CFR 294.9, and managed to protect the special features in their natural condition, and to foster public use and enjoyment of those features.

Minerals and Energy direction: Protection of SIA areas will be required during mineral exploration and development activities. An area may be recommended from withdrawal for mineral entry in situations where mitigation measures do not adequately protect management area values, and all values (including minerals) have been evaluated. Removal of common mineral material within the management area will not be permitted.

MA B1 – 2,5016 acres – Wilderness

Description: One of the three designated wildernesses in the Umatilla National Forest the North Fork Joh Day, is partially located within the Granite Mining analysis area:
Specific management direction for the North Fork John Day wilderness is summarized in the Umatilla Forest Plan, Appendix 6.

Minerals direction: The wilderness is closed to mineral entry and mineral leasing, subject to valid existing rights. Occupancy, structures and use of motorized and mechanized equipment related to mining activities are permitted to the extent allowed by law and regulations. Every reasonable effort should be made through the Operating Plan to minimize their effect on the wilderness resource, compatible with rights of claimants and lessees.

MA B2 – 145 acres – RNA in Wilderness

Description: Research Natural Area in wilderness.

Minerals direction: For an RNA(s) established in wilderness, management direction for wilderness will take precedence. Research on RNA's in wilderness will be related to wilderness.

Minerals direction: Valid claims existing prior to Research Natural Area designation may be developed. Valid claims existing prior to any withdrawal from mineral entry shall be required to have an operating plan providing the least amount of impact. Mineral leases will require 'No Surface Occupancy' stipulation. Research Natural Areas may be recommended for withdrawal from mineral entry in situations where mitigation measures do not adequately protect management area values. The mineral potential of the area shall be assessed before withdrawal is recommended.

MA B7 – 51 acres – Wild and Scenic River in Wilderness

Description: Wild and Scenic River in wilderness. River sectors located within wilderness will be managed under wilderness or Wild and Scenic River principles and standards and guidelines, whichever is most restrictive.

Minerals direction: Subject to valid existing rights, minerals that constitute the bed or bank or are situated within one-quarter mile of the bank of any river designated a Wild river are withdrawn from appropriation. On other river sections, through analysis and consideration of all public values, including minerals values, rivers may be recommended for withdrawal from mineral entry where appropriate and necessary. Protect river and corridor from common materials mining. Common mineral materials will not be removed pending completion of the river management plans.

MA C1 – 1,244 acres – Dedicated Old Growth Forest Habitat

Description: Designated mature and old growth forest stands will be located and retained to distribute suitable habitat throughout the Forest for wildlife species dependent upon this habitat type. Forest stands will meet ecological, biological, size and distribution criteria as suitable old growth for survival and reproduction of indicator species.

Minerals direction: Meet Forest-wide Standards and Guidelines.

MA C7 – 16,242 acres – Special Fish Management Area

Direction: The special fish management area includes all land within a watershed, subwatershed, or other manageable area. The management area applies to much of the Umatilla National Forest portion of the North Fork John Day River drainage (referred to in Senate Report No. 98-465, dated May 18, 1984). The management area is located on the North Fork John Day Ranger District, as shown on management area maps.

Minerals Direction: Meet Forest-wide Standards and Guidelines while protecting fish habitat investments.

MA D2 – 34 acres – RNA

Direction: Eight areas have been identified and are managed as research natural areas. Two (Pataha and Rainbow Creek) have been established by Chief's order. The other six candidate areas are: Elk Flats Meadow, Elk Flats-Wenaha Breaks, Kelly Creek Butte, Mill Creek Watershed, Vinegar Hill, and Birch Creek Cove. Establishment reports and management plans for each area may contain more specific constraints or permitted uses.

Minerals direction: Valid claims existing prior to Research Natural Area designation may be developed. Valid claims existing prior to any withdrawal from mineral entry shall be required to have an operating plan providing the least amount of impact. Mineral leases will require 'No Surface Occupancy' stipulation. Research Natural Areas may be recommended for withdrawal from mineral entry in situations where mitigation measures do not adequately protect management area values. The mineral potential of the area shall be assessed before withdrawal is recommended.

Roads Analysis

The interdisciplinary team completed a roads analysis to consider the relationship between roads and mine access in the watershed. This separate analysis is discussed in detail in the Access/Transportation section of Chapter 3.

Public Involvement

Public involvement is a part of the process mandated by NEPA (40 CFR 1501.7), in order to identify issues and concerns related to the environmental impacts of the proposed action. On October 13, 2011, the Whitman Ranger District of the Wallowa-Whitman National Forest (WWNF) and the North Fork John Day Ranger District of the Umatilla National Forests (UNF) mailed a scoping letter for the Granite Creek Watershed Mining Plans proposal to interested parties, tribes, agencies, and miners in the Granite Creek Watershed. The Notice of Intent (NOI) to prepare this EIS was published in the Federal Register on October 11, 2011. The project was

listed in the April 2010 Wallowa-Whitman National Forest Schedule of Proposed Actions (SOPA).

Both forests had previously initiated environmental analyses for proposed mining Plans of Operation (Plans) in the portions of the Granite Creek Watershed under their administration. As issues identified by each forest were similar, the responsible officials decided that combining the analysis into one EIS would be the most efficient way to complete the task.

Requests for comments (scoping) for the preparation of the analysis began in October 2011. Scoping letters were sent to approximately 200 interested parties, including: individuals, groups, miners, county, State and Federal agencies, the Nez Perce Tribe, the Warm Springs Tribe, and the Confederated Tribes of the Umatilla Reservation (CTUIR). A list of interested parties to whom both letters were mailed and copies of the letters are located in the analysis file, as is a copy of the NOI. The letter included a table with a list of the mining operations that would be included in the EIS.

During the scoping process the following concerns and comments were received: impacts from road work, excavation, and water use ; impacts to water quality, wildlife, management indicator species and threatened and endangered species and habitat; impacts to native vegetation, roadless areas and wilderness; potential spread of weeds; impacts from OHV use and camping; and adequacy of ESA Section 7 consultation.

Staff to staff meetings were held between the Forest Service and the CTUIR to discuss the Granite Creek Watershed Mining Plans project on June 13, 2013, June 25, 2013, June 4, 2014 and July 15, 2014.

Information obtained as a result of the scoping process is located in the Granite Creek Watershed Mining Plans EIS analysis file and was used to develop the issues and alternatives for this DEIS.

Several miners who submitted proposals for this DEIS requested Applicant Status (as authorized under the Endangered Species Act) to review and provide comment on the draft Granite Creek Watershed Mining Project Biological Assessment. A meeting between the Forest Service and the applicant status miners was held July 2, 2014 in La Grande, Oregon to clarify the contents of the biological assessment, and to discuss corrections to the miners' proposed Plans. Follow up field visits with several of the miners and Forest Service personnel occurred in July 2014 to further clarify proposed activities.

Following completion of this Draft Environmental Impact Statement (DEIS), a notification of its availability and public comment period will be published in the Federal Register. The Forest Service will respond in the FEIS to comments from the public, interested organizations, State and Federal agencies, and local Tribes in accordance with 40 CFR 1503.4.

Issues

Significant issues are those points of concern that would change among the alternatives. A Forest Service interdisciplinary team (IDT) of resource specialists used comments gathered at internal and public scoping meetings and from letters from interested parties to help define significant issues. Alternatives to the proposed action are based on changes of impacts to these issues.

Significant Issue 1: Water Quality and Quantity

Water quality in the Granite Creek Watershed has been impaired by past timber harvest and road building, beaver trapping, grazing and hydraulic, placer, and dredge mining. These activities have altered stream channel morphology, abundance and distribution of riparian vegetation, runoff patterns and volumes, and the stream-valley floor surface hydrologic connection, and type of ground cover. The result has been changes in flow regimes, the movement and storage of sediment, the movement and storage of water in the watershed, bank stability, and substrate composition. Water quality parameters affected by these changes are stream temperatures, concentrations of heavy metals, and water clarity (turbidity).

The Forest Service has summer stream temperatures for 12 streams in the Granite Creek watershed. All of these streams have temperatures that exceed the applicable state water quality standard of 53.6°F for bull trout spawning and rearing (See Appendix 5). Prior to 2010, four of these streams (Beaver, Bull Run, Clear and Granite) were 303(d) listed by Oregon Department of Environmental Quality (ODEQ) as water quality limited for temperature and in two cases, sedimentation. As a result of the completion of the John Day River Basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP) in 2010 (ODEQ 2010), the four streams were delisted listed for temperature. However, delisting does not mean that the stream temperatures are now acceptable, but that all feasible steps will be made to decrease the elevated stream temperatures and prevent further rises. As such, Plans were evaluated for potential impacts to stream temperatures to determine compliance with the TMDL/WQMP. With respect to sedimentation, Bull Run and Granite Creeks remain 303(d) listed as impaired and Plans were evaluated for the potential to increase sedimentation on these streams.

Table I-4: 303(d)-Listed Streams in the Granite Creek Watershed (ODEQ, 2010)

Stream Name	Subwatershed Location	Reason for Listing
Bull Run Creek	(170702020201)	Sedimentation (river mile 0 to 9.3)
Granite Creek	(170702020202)	Sedimentation (river mile 11.2 to 16.2)

Key Indicators

Measurements used to compare the alternatives in relation to this issue:

1. **Sediment input** – number of Plans that have the potential for a discharge.
2. **Heavy metal input** – number of Plans that have the potential for a discharge of heavy metals via groundwater or directly via surface water.
3. **Warm water input** - number of Plans that have the potential for a discharge of warm water via groundwater flow.
4. **Creosote input** -- number of Plans that have the potential for a discharge of creosote into surface water

5. **Stream temperature** – number of Plans that have the potential to locally alter stream temperatures from a water withdrawal, input of warm water, or a groundwater flow reversal.
6. **Stream flow** – number of Plans that have the potential to locally reduce stream flow from a water withdrawal or groundwater flow reversal.

Significant Issue 2: Fish Habitat and Species

Fish species listed as threatened under the Endangered Species Act and their designated critical habitat occurring within the Granite watershed are Columbia River Bull Trout and Mid-Columbia River steelhead. Mid-Columbia Spring Chinook Salmon are Forest Service Sensitive and occupy Magnuson-Stevens Act-designated Essential Fish Habitat. Interior Redband trout (*Oncorhynchus mykiss gairdneri*) are distributed throughout the Granite watershed, are on the Regional Forester's list of sensitive species, and are a UNF and WWNF management indicator species (MIS). Another Regional Forester's sensitive fish species located in the project area is Westslope cutthroat trout (*Oncorhynchus clarki lewisi*).

Approximately 40 percent (37,445 acres) of the Granite Mining analysis area occupies Management Area 18 - Anadromous Fish Emphasis. Approximately 17 percent (16,242 acres) of the Granite Mining analysis is in Management Area C7 on the UNF-Special Fish Management Area. These management areas are intended to achieve and maintain optimum conditions for anadromous fish. Emphasis is placed on providing anadromous fish habitat at, or near, the maximum potential of the watershed where this area is applied. Emphasis is placed on protecting fish habitat and habitat investments through reasonable provisions in plans of operation and in reclamation requirements.

Past placer mining operations, in an effort to expose placer deposits in the Granite Creek Watershed, have removed trees, shrubs, and ground cover in the flood-prone areas immediately adjacent to the Granite, Clear, Bull Run, Boulder, Last Chance, Ten Cent, Olive, Ruby, Lightning, McWillis, Quartz and Lucas Gulch creeks. This past mining-caused ground disturbance has altered:

- Instream habitat such as pool frequency and distribution, altered substrate composition (including a loss of fine material), off channel habitat, and instream large woody material (LWM), and
- Riparian habitat such as canopy cover adjacent to stream reaches and bank stability.

Water quality has been affected by past placer mining operations. The exposed soil on the mining access roads and the disturbed flood-prone areas immediately adjacent to the Granite, Clear, Bull Run, Boulder, Last Chance, Ten Cent, Olive, Ruby, Lightning, McWillis, Quartz and Lucas Gulch creeks could increase the amount of sediment entering these streams, resulting in degradation of existing spring chinook salmon, summer steelhead, and redband trout spawning, incubating, and rearing habitat in these streams.

Key Indicators

Acres of areas with risk to:

1. **Instream habitat** (i.e. pool frequency and distribution, substrate composition, and channel complexity) and

2. **Riparian habitat** (i.e. riparian vegetation type and distribution that influence shade, bank stability, and large woody recruitment).

Plans with proposed activities with risk to fish species:

1. **Stream fording** (frequency and timing of crossing)
2. **Suction dredging**
3. **Water quality** (i.e. sediment inputs, heavy metal inputs, and water temperature increases)

Table 1-5: Streams with Listed and Sensitive Fish Species

Stream name	Forest	Spring Chinook	Mid-C Summer Steelhead	Columbia River Bull trout	Interior Redband trout
Granite Creek	UNF and WWNF	Present	Present	Present	Present
Boulder Creek	WWNF	-	Present	Present	Present
Last Chance Creek	WWNF	-	-	-	-
Bull Run Creek	WWNF	Present	Present	Present	Present
Clear Creek	UNF	Present	Present	Present	Present
Ruby Creek	UNF	Assumed in lower reaches	Present	Assumed in lower reaches	Present
Lightning Creek	UNF	Present	Present	Present	Present
Lucas Gulch	UNF	-	-	-	Assumed Present
Olive Creek	WWNF	Assumed present in lower reaches	Present	-	Present
McWillis Gulch	WWNF	-	Assumed in the lower reaches	-	Present in the lower reaches
Quartz Gulch	WWNF	-	Probable	-	Present
Ten Cent Creek	UNF	Present	Present	-	Present

- = not present, ?= unknown

Other Resource Concerns

Issues that were not considered significant, but help to better understand the consequences of proposed activities were considered as issues to be tracked throughout the document. These issues are generally of high interest or concern to the public, or are necessary to understand the full extent of the alternatives. These issues provide additional information for the analysis but do not drive the formulation of alternatives.

Wildlife

The analysis area contains documented occurrences or habitat for several TES (Threatened, endangered or sensitive) wildlife species and Management Indicator species identified in the WWNF and UNF Forest Plans. Proposed mining activities areas are in most cases adjacent to or within ¼ mile of open public travel areas.

Noxious Weeds

Although not a significant issue, noxious weeds can develop into a major concern if appropriate mitigations are not applied.

Exposure of mineral soil caused by mining operations can create ideal conditions for the spread of noxious weeds. High priority noxious weeds are invasive, persistent, and prolific reproducers. They displace desirable vegetation and currently occur at scales that make treatment difficult. It is anticipated that many more infestations actually occur than are inventoried.

Mining operations have the potential to spread many of the noxious weeds known to exist in the analysis area or introduce others. Precautions are needed to prevent spread when ground-disturbing activities and vehicular traffic occur near known locations of noxious weeds.

Cultural Resources

Section 106 of The National Historic Preservation Act compels federal agencies to take into account the effect of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places. Executive Order 11593 includes direction about the identification and consideration of historic properties in federal land management decisions. It directs federal agencies to inventory cultural resources under their jurisdiction, to nominate to the National Register of Historic Places federally owned properties that meet the criteria, to use caution until the inventory and nomination processes are completed, and to ensure that federal plans and programs contribute to preservation and enhancement of non-federally owned properties. The significance of any cultural resources that are located during the inventory will be evaluated in consultation with the State Historic Preservation Office (SHPO). Cultural resources that are eligible or potentially eligible for the National Register of Historic Places will be protected during project implementation. Should unexpected cultural resources be encountered during project implementation, these resources will be protected from disturbance and will also be evaluated for eligibility for inclusion on the National Register. Significant resources will be protected, generally through avoidance, or mitigated following consultation with the SHPO and in some cases the Advisory Council on Historic Preservation.

Sensitive Plants

The analysis area does not contain documented occurrences or habitat for any ESA threatened, endangered, candidate or proposed plant species.

There are approximately two dozen locations for Region - 6 sensitive *Botrychium* species located within the Granite Creek Watershed on both the Wallowa - Whitman and Umatilla National Forests. The sites are represented by the following species: *Botrychium crenulatum*, *B. montanum*, *B. minganense*, *B. lanceolatum*, *B. lunaria* and *B. pinnatum*.

Visual Quality

Scenery Resources are a critical element of the social perception of Forest Service Management. The appearance and sustainability of scenery attributes viewed from access routes and viewpoints are what the public uses to initially evaluate the condition of the forest landscape. The landscape character of an area is the sustainable visual and cultural image of an area. Management of these scenery resources uses two indicators to evaluate the appearance and sustainability of the landscape character. Scenic integrity or Visual Quality Objectives determine the limits of acceptable human alterations, and scenic sustainability determines the limits of acceptable risk of loss of attributes.

The viewshed from Grant County Road 24, Forest Service Road 73 and 10 is analyzed in this EIS. These routes are designated concern level one routes and are used as viewing platforms by the majority of the public.

Social/Economic

Early federal minerals legislation encouraged the settlement and economic development of western lands. The General Mining Law of 1872 opened the public domain to mining activities. In the early 1980's the public's ability to sell gold on the open market resulted in increasing gold prices. This has resulted in a renewed interest in gold mining. It is believed that gold, silver and other precious metals/minerals still exist in the area in sufficient quantities to be profitably extracted in small scale operations such as those that have taken place in the recent past. As many people are requesting to re-work past workings, there is also the potential for reclamation of past disturbances.

Chapter 2 - Alternatives

Introduction

This chapter describes and compares the alternatives considered for the Granite Creek Watershed Mining Plans. For a description and map of each alternative considered see Appendix 8 – Plan Summaries and Maps. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision-maker and the public.

Chapter 2 describes the management alternatives developed for the Granite Mining Plans of Operations. Alternatives encompass the range of management options from which the District Rangers can select a preferred alternative. This chapter includes a description of the following:

- The alternative development process
- Alternatives considered but eliminated from detailed study
- Alternatives analyzed in detail, including elements common to all alternatives
- Requirements and Protection Measures for the alternatives
- Monitoring Measures
- Alternative comparisons related to resource area issues

Alternative Development

The proposed action was developed from the proposed Plans of Operations as submitted by the miners. A Forest Service interdisciplinary team (IDT) of resources specialists used comments and suggestions gathered at internal meeting and through the public scoping process to help define the key issues. The alternatives carried forward for detailed study are designed to resolve issues surrounding the proposed action.

Alternatives Considered But Eliminated from Detailed Study

No Mining, Reclamation Only, Existing Claims Bought Out

An alternative was considered that outlined a no-mining scenario and included a proposal for buying out existing claim owners. In this scenario, mining operations would cease, reclamation would be required, a validity examination would be made for each claim, and a dollar amount calculated for the minerals that would not be extracted. Claimants would be compensated for the taking, and the area would be withdrawn from mineral entry. This alternative was not carried forward as a viable alternative because it would be in conflict with the 1872 Mining Law and other laws that direct the Forest Service to support and facilitate mineral extraction. Also, there is currently no mechanism by which the Forest Service can buy a claimant out. Additionally,

withdrawing an area from mineral entry is not within the jurisdiction of the Forest Service. This alternative does not meet the purpose and need of authorizing the approval of mining Plans of Operations in the Granite Creek Watershed.

Addressing Water Quality Problems in the Granite Watershed through road closures and decommissionings:

An alternative was considered to address both water quality concerns and road density issues by closing and/or decommissioning roads. Although managing road density for public use and other resource benefits is a goal of national forest management, many of the open roads in the watershed are not reasonably connected to the proposed mining operations. Consequently, analyzing this alternative in this context adds complexity and expands the scope of the decision beyond what is needed to make a decision on the proposed mining operations.

Alternatives Considered in Detail

Three alternatives were considered in detail.

Alternative 1 represents the “No Action/No Change” Alternative. The proposed Plans of Operations included in this EIS would not be approved or extended.

Alternative 2 is the Proposed Action, which is the proposed Plans of Operations as submitted by the miners.

Alternative 3 is the proposed Plans of Operations as submitted by the miners, with additional Forest Service Requirements designed to protect water quality, fish habitat, soils and other resources.

Alternative 1 - No Action/No Change in Present Situation

- **Includes 27 areas covered by the Proposed Plans of Operation**

A “No Action” alternative is required by regulation in 40 CFR 1502.14(d). It is used in part to measure action alternatives to determine the effects of not implementing an action alternative. In this analysis, this alternative maintains the current situation; it allows the ongoing Notice of Intent activities to continue in the watershed. None of the proposed Plans would be approved. This alternative does not meet the purpose and need to authorize the approval of proposed Plans of Operations in the Granite Creek Watershed. This alternative cannot be implemented, since Forest Service Regulations in 36 CFR 228, Subpart A, does not provide for denying a reasonable Plan of Operations. The Plans of Operations included in this alternative are in the analysis file.

The tables and maps in this chapter display the proposed Plans of Operations under Alternative 1.

The development of this alternative is in response to NEPA regulations 36 CFR 220.5(d) and 40CFR1502.14 (d). It is the result of not implementing the proposed action, which in this case is authorizing the approval of several proposed Plans of Operation in the Granite Creek Watershed Mining area. However, the Forest Service mining regulations (36 CFR Part 228) do not provide for the denial of a reasonable Plan of Operation on areas open to mineral extraction. Because of this, the no action alternative will be used as a base line for comparison of the effects.

For analysis purposes only, selection of the No Action Alternative would result in the following:

- Miners who have proposed to renew/continue with previously approved plans of operation would initiate reclamation and closure requirements on their existing mining sites, structures and user-created roads, in accordance with the requirements of their previously authorized Plan of Operation.
- Miners who have proposed an initial Plan of Operations would not receive authorization.
- Prospecting would continue as described under 36 CFR 228.4 provided it complies with federal and state laws. In areas open to mineral extraction, other activities would continue as defined by 36 CFR 228.4(a)&(a)(1).

The following table gives a brief description of the No Action Alternative for each area described in the proposed Plan of Operations in the Granite Creek Watershed. All of these sites are currently in a stable condition, and are waiting for approval of their proposal Plan of Operations prior to commencing operations included in that Plan. There is currently no large scale mining activity on any of these sites; large equipment has been removed or parked. Disturbed areas of soil have been grass seeded. Sites are annually checked to insure that ponds, roads and other structures are safe and do not present an erosion problem. Current mining activities on these sites have been limited to assessment work and NOI work as described in 36 CFR228.4.

Table 2-1: Description of Operations under Alternative 1

Proposed Plan	Alternative 1	Forest	Drainage
Altona	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Quartz Gulch
Belvadeear Group	Equipment would be removed	WWNF	Olive Creek
Blue Sky/Bull Run	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Bull Run Creek
Blue Smoke	Site would remain as is. There is nothing to clean up or equipment to be removed.	UNF	Granite Creek
Bunch Bucket	Site would remain as is. There is nothing to clean up or equipment to be removed.	UNF	Clear Creek
City limits	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Granite Creek
East Ten Cent Creek	Cabin and road would be removed	UNF	East Ten Cent Creek

Proposed Plan	Alternative 1	Forest	Drainage
Eddy-Shipman	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF/UNF	Granite Creek
Grubsteak	Bridge equipment,& shed removed, the large hole would be filled in.	UNF	Clear Creek
Hopeful 1	Cabin would be removed	UNF	Granite Creek
Hopeful 2&3	Cabins and road would be removed.	UNF	Granite Creek
L&H	Shed would be removed	WWNF	Olive Creek
Lightning Creek	Bridge removed, Cabins maintained as historical structure.	UNF	Lightning Creek
Little Cross 1	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Granite Creek
Lucky Strike	Cabins maintained as historical structure	WWNF/ UNF	Lightning Creek
Make It	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Granite Creek
Muffin	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Last Chance Creek
Old Eric 1&2	Site would remain as is. There is nothing to clean up or equipment to be removed.	Umatilla	Granite Creek
Olive Tone	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Olive Creek
Rose Bud 1-4	Site would remain as is. There is nothing to clean up or equipment to be removed.	UNF	Granite Creek
Royal White Group	Cabins would be removed, Adits would be gated.	WWNF	Irish Gulch
Ruby Group	Cabin would be removed	UNF	Ruby & Clear Creek
Sunshine/McWillis	Cabins and road would be removed	WWNF	McWillis Gulch
Tetra Alpha Placer and Tetra Alpha Mill & Lode	Equipment and roads would be removed.	WWNF	Boulder Creek and Last Chance Creek
Troy D	Equipment and gates would be removed	WWNF	Granite Creek
Yellow Gold	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Last Chance Creek
Yellow Jacket	Spring development and sheds would be removed. Site would remain as is.	WWNF	Orofino Gulch

Alternative 2 - Proposed Action (Plans of Operations as submitted by the Miners)

- Authorizing approval of 28 mining Plans of Operations as submitted by the miners *(Note that Tetra Alpha Placer, Mill and Lode has been split into 2 Plans under this alternative (Tetra Alpha Placer and Tetra Alpha Mill & Lode) (Table 2-2), therefore the change from 27 Plans in Alternative 1, to 28 Plans in Alternative 2)*
- Authorizing use of 4.71 miles of previously closed or decommissioned Forest Service roads 4.26 closed and .45 decommissioned)
- Authorizing use of 8.98 miles of existing miner-created temporary roads
- Authorizing use of 0.3 miles of new temporary roads created by the miner whether by blading or continued travel
- Authorizing use of 9 existing fords on FS closed or existing miner-created roads
- Authorizing construction of 2 new fords (2 fords at Tetra Alpha Placer)
- Authorizing placement of 2 temporary bridges to be removed at the end of each operating season (Bull Run Site #2 and Ruby Group)
- Authorizing installation of 3 new gates on non-system miner created roads (East Ten Cent Creek and Hopeful 2&3)

Alternative 2 would authorize the approval of the Plans of Operations (Plans) as submitted by the miners. The total number of Plans proposed for approval under this alternative is 28 (Table 2-2). The Plans of Operations included in this alternative are in the analysis file. Summaries and sketch maps of each proposed Plan of Operations can be found in Appendix 8.

All Plans would contain a variety of requirements to meet 36 CFR 228 Subpart A. All operations must meet all other applicable State and Federal laws, including but not limited to the Clean Water Act, the National Historic Preservation Act, the Archaeological Resource Protection Act, the Endangered Species Act, State suction dredging requirements, and all applicable State and Federal fire regulations.

This page intentionally left blank.

Table 2-2: Proposed Plans of Operations under Alternatives 2 and 3

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Altona (Placer) WWNF	T. 10 S.- R. 35 E. Sec 03 Quartz Gulch- (5 acres)	150 gpm for wash plant/ adit	Backhoe, dump truck, wash plant, pickup	Action: Placer mining and gravity processing along the north side of the creek. Construct 2 ponds. Dig and rehab a series of test pits throughout the area (20'x20'x10'deep).	Access: Decommissioned FS roads, along with the development of existing and designated temporary roads to work the site. Gate temporary road access.	Action: Same as Alt 2, Access: Use existing rather than decommissioned roads to access area. (see Table 2-3)	WRPMs (site-specific water resource protection measures) All General Requirements except lode requirements
Belvadeear Group (Placer) WWNF	T. 09 S.- R. 35 E. Sec 35 Olive Creek- (3 acres)	4 cfs:80gpm / Olive Creek - 1937 water right	Backhoe, dozer, dump truck, highbanker, pump, trommel, compressor, hand tools.	Action: Placer mining and gravity processing along the east side of the creek. Use of existing ponds. Up to ¼ acre could be worked at a time.	Access: Existing FS roads, existing temporary road, development of new designated temporary roads to work the site.	Same as Alt 2	Fish Protection Measure All General Requirements except lode requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Blue Sky/Bull Run (Placer) WWNF	T. 09 S.- R. 35½ E. Sec 13 T. 09 S.- R. 36 E. Sec 18,19 Bull Run Creek- (2 acres)	150 gpm Trommel / Existing dredge ponds	Backhoe, trommel, pump, atv's dump-bed trailer, suction dredge, hand tools.	Action: Placer mining and gravity processing of revegetated dredge tailings. Up to 1/5 acre will be worked at a time to process up to 5 cubic yards a day. Use of existing ponds. Suction dredging in Bull Run Creek.	Access: County road 24, existing FS roads, development of existing and designated temporary roads to work each site. Placement of a temporary flatbed bridge. Existing ford on Bull Run & Swamp Creek. Ford Use (2-3 months in summer) Heavy equipment: 2-4 round trips per season Other vehicles (pickup truck): 2-5 round trips per day	Action: Same as Alt 2, Access: Alternate access roads would replace the need for the temporary flatbed bridge proposed under Alt 2(see Table 2-3)	Cultural Resource Protection Measure (Blue Sky 2), WRPMs, Transportation Protection Measure All General Requirements except lode requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Blue Smoke (Placer) UNF	T. 09 S.- R. 35½ E. Sec 04 Granite Creek (2 acre)	Trommel / Existing dredge ponds	Backhoe, dozer, dump truck, tommel, atv, pump, suction dredge, hand tools,	Action: Placer mining and gravity processing of the high bank area on the north side of the powerline road. A series of holes 20'x25'x10'deep will be dug. Use of existing ponds. Suction dredge in Granite Creek	Access: Existing power line access road on FS land.	Same as Alt 2	WRPM (processing site) All General Requirements except lode requirements
Bunch Bucket (Placer) UNF	T. 09 S.- R. 35 E. Sec 22 Clear Creek- (10 acres)	Unspecified/ miner created ponds.	Crawler-loader with backhoe attachment, trommel, wash plant.	Action: Placer mining and gravity processing. Trenches (2'x200'x8') deep will be dug in order to process 600 cubic yards per year.	Access: Existing FS roads, existing temporary roads, and new designated temporary roads to work the site.	Same as Alt 2	Cultural Resource Protection Measure, WRPM All General Requirements except lode requirements
City Limits (Placer) WWNF	T. 09 S.- R. 35½ E. Sec 04 Granite Creek- (1 acres)	80-100 gpm / Old dredge ponds in tailings area.	bobcat or backhoe, wash plant, sluices, highbankers, pumps, hand tool	Action: Placer mining of the high bank along the gravel and gravity processing at existing dredge ponds. Pits will be dug (20'x30x8' deep) in order to processing 3-5 cubic yards per day.	Access: Existing FS roads and existing temporary roads	Same as Alt 2	All General Requirements except lode requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
East Ten Cent (Placer) UNF	T. 08 S.- R. 35½ E. Sec 28 East Ten Cent Creek- (2 acres)	Unspecified / miner created pond	Backhoe, Trommel, highbanker, dredge, water pumps, Generator, ATV's	Action: Placer mining along the west side of the creek. Pits will be dug (12'x10' deep) in order to get processing material. Continued use of existing structures.	Access: Existing FS roads (UNF closed), existing temporary roads and develop a new temporary road to work site. Two gates for temporary road access.	Same as Alt 2	WRPMs All General Requirements except lode requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Eddy Shipman (Lode & Placer) UNF & WWNF	T. 08 S.- R. 35½ E. Sec 23 Granite Creek- (3 acres)	100-150 gpm / Chipman Gulch	Backhoe, mucker, dump truck, water pumps, compressor, and hand tools.	Action: Lode exploration & placer mining. Gravity processing of placer material. Milling (with an arrastra) and gravity processing of underground lode material. Some off- Forest processing. Existing ponds. Development of Mill site in order to process 5 cubic yards per day. Continued use of existing structures.	Access: Existing FS roads along with the development of existing temporary roads to work the site. Existing ford on Olive Creek. Existing FS gate & barricade. Ford Use (2-4 months of summer) Heavy equipment: 2-4 round trips per season to bring equipment in and out. 1-2 round trips per week to haul material to processing site. Other vehicles: 2-4 round trips per month for fuel and other maintenance items.	Same as Alt 2	WRPMs, Cultural Resource Protection Measure, Transportation Protection Measure All General Requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Grubsteak (Placer) UNF	T. 09 S.- R. 35 E. Sec 14 Clear Creek- (2 acres)	Unspecified / Existing miner created pond.	Backhoe or excavator, trommel or shaker, pumps, sluices, hand tools, and generator.	Action: Placer mining and gravity processing at two sites. Each less than $\frac{1}{8}$ acre in size. Existing pond. Continued use of shed.	Access: Existing temporary road, existing miner's bridge and gate to work the site. Existing equipment ford across Clear Creek. Ford Use (intermittent use during summer) Heavy equipment: 0-4 round trips per season	Same as Alt 2	WRPMs All General Requirements except lode requirements
Hopeful 1 (Placer) UNF	T. 08 S.- R. 35 E. Sec 29 Granite Creek (1 acres)	Sluice box/ existing dredge pond	Trommel (12"x5'drum), sluice, pickup, small backhoe, pumps, generator, RV trailer.	Action: Placer excavations and gravity processing of the high bank area (less than $\frac{1}{4}$ acre) along the old dredge tailings (approx. 2 yards per year). Continued use of existing structures.	Access: Existing FS road, existing temporary road. (UNF closed)	Same as Alt 2	Fish Protection Measure, Cultural Resource Protection Measure All General Requirements except lode requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Hopeful 2&3 (Placer) UNF	T. 08 S.- R. 35 E. Sec 28 Granite Creek- (4 acres)	Unspecified / miner constructed ponds and an unnamed tributary.	Backhoe or cat, pickup, grader, dump truck, hand tools, water filtration building.	Action: Placer mining on the North and south sides of the creek. Pits will be dug (6'x3'x10'deep) in order to process 15 cubic yards a year. 2 existing ponds. Continued use of existing structures.	Access: Existing FS roads, existing temporary roads, development of temporary roads to work the site. Use 2 fords on Granite Creek. Gate temporary access. Ford Use (intermittent use during summer) Heavy equipment: 0-4 round trips per season Other vehicles: _1-2 round trips per week with a pickup for fuel and other maintenance items.	Action: Same as Alt 2 Access: Change ford use to only one (west side)	WRPMs All General Requirements except lode requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
L&H (Placer/Lode) WWNF	T. 10 S.- R. 35 E. Sec 10,11 Olive Creek- (8 acres)	60 gpm/ Adit snow, runoff to miner created ponds.	Backhoe, wash plant, pickups, pumps, hand tools.	Action: Placer mining, gravity processing; and re- open existing adits for testing. Placer digs will be 20'x30'x10'deep in order to collect material for processing. Use of existing ponds.	Access Existing FS roads along with the development of existing temporary roads to work the site. Existing ford on 1305-020. Ford Use (intermittent use during summer) Heavy equipment: Occasional use, (1- 4 round trips) will bring in at beging and end, occsional trips for repairs etc. Other vehicles: Daily access to campsite with a pickup or ATV.	Same as Alt 2	WRPMs (lode), Cultural Resource Protection Measure All General Requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Lightning Creek (Placer) UNF	T. 09 S.- R. 35 E. Sec 28,33 Lightning Creek- (5 acres)	100 gpm /Existing Water right to the creek, miner created ponds.	Backhoe, excavator, dump trucks, washing plant, trommel, suction dredge, generator, pumps, hand tools.	Action: Placer mining and gravity processing of 3 sites along the highbanks on the south side of the creek. Pits will be 50'x100'x15'deep and process 20-50 cubic yards per day when working. Continued use of existing structures. Suction dredging in Lightning Creek.	Access: Existing FS roads (UNF open), existing temporary roads, existing miner's bridge and equipment ford on Lightning Creek. Ford Use (only during instream work period July15-Aug15) Heavy equipment: 1-4 round trips per season. Other vehicles: None (bridge)	Same as Alt 2	Fish Protection Measures, Cultural Resource Protection Measure All General Requirements except lode requirements
Little Cross 1 (Placer) WWNF	T. 09 S.- R. 35½ E. Sec 04 Granite Creek- (1 acre)	Unspecified / miner created pond.	Backhoe, highbanker, suction dredge, hand tools	Action: Placer mining and gravity processing at one site on the north side of Granite creek. The total site is less than ¼ acre in size. Suction dredging in Granite Creek.	Access: Existing temporary road on FS land.	Same as Alt 2	WRPMs All General Requirements except lode requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Lucky Strike (Placer/Lode/ Mill) UNF & WWNF	T. 10 S.- R. 35 E. Sec 03 Pete Man Ditch & Lightning Creek- (2 acres)	Unspecified / spring	Backhoe, generator, rotohamer, chainsaw, hand tools, pickup	Action: Placer testing and reclamation of existing adits and shafts. Continued use of existing structures and repair old mill.	Access: Existing FS roads.	Same as Alt 2	Cultural Resource Protection Measures All General Requirements
Make it (Placer) WWNF	T. 08 S.- R. 35½ E. Sec 27 Granite Creek- (2 acres)	100 gpm / Granite Creek side channel pond.	hand tools, gold spinner, backhoe, trommel, pump	Action: Placer mining and gravity processing of the highbank along the east side of the creek. 15-20 cubic yards per year will be processed from holes 15'x20'x10'deep.	Access: Existing FS roads along with the development of existing and designated temporary roads to work the site. Existing miner's gate	Same as Alt 2	WRPMs, Fish Protection Measure, Cultural Resource Protection Measure All General Requirements except lode requirements
Muffin (Placer) WWNF	T. 09 S.- R. 35½ E. Sec 34 Last Chance Gulch- (3 acres)	Not specified / Dammed pond on Last Chance Ck.	Backhoe, wash plant, trommel, handtools, dumptruck	Action: Placer mining and gravity processing on the east side of the creek. (approx. 10 cubic yards per year). Existing ponds and processing site.	Access: Existing FS roads along with the development of existing and designated temporary roads to work the site.	Same as Alt 2	WRPM All General Requirements except lode requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Old Eric 1&2 (Placer) UNF	T. 09 S.- R. 35½ E. Sec 04 Granite Creek- (1 acre)	Not specified / Surface collection	Backhoe, sluice, suction dredge, handtools, camptrailer	Action: Placer mining and gravity processing of the high bank area along granite creek. Max of 5 cubic yards per year will be processed from this single ¼ acre work site. Suction dredging in Granite Creek..	Access: Existing temporary road.	Same as Alt 2	WRPM All General Requirements except lode requirements
Olive Tone (Placer) WWNF	T. 10 S.- R. 35 E. Sec 02 Olive Creek- (2 acres)	4cfs:80gpm / Olive Creek - 1937 water right	Backhoe, trommel, wash plant, generator, pump, camp trailer	Action: Placer mining of the highbank areas along Olive Creek. Holes 30'x30'x10' will be worked at a time. Two ponds (20'x10'x10' will be constructed	Access: Existing FS road, existing temporary road. Existing access ford on Olive Creek. Ford Use (2-3 months of summer) Heavy equipment: 2-4 round trips) will bring in at beginning and end, occasional trips for repairs etc. Other vehicles: 1-2 round trips per day with an ATV to access the travel trailer.	Same as Alt 2	WRPM, Fish Protection Measures All General Requirements except lode requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Rose Bud 1-4 (Placer) UNF	T. 09 S.- R. 35 E. Sec 01 Granite Creek- (5 acres)	Not specified / Old dredging ponds	Backhoe, trommel, water pump, gold spinner, and 3- yard dump truck	Action: Placer mining of the high bank area north of the powerline road. (Processing 2-10 cubic yards per year)	Access: Existing power line access road on FS land.	Same as Alt 2	WRPM, Fish Protection Measure All General Requirements except lode requirements
Royal White Group (Lode) WWNF	T. 10 S.- R. 35 E. Sec 03 Pete Man Ditch & Irish Gulch and Olive Creek (10 acres)	100 gpm / adit, snow melt, spring, storage reservoir, hailed from off site	Backhoe/bobcat, dozer, dump truck, ball mill, crusher, compressor, mucker, pumps, timber saw	Action: Underground mining of existing adits, processing at mill, and continued use of existing structures. (Up to 5 tons will be crushed and milled per day) Continued use of structures.	Access: Existing FS roads, private roads, and existing temporary roads to work the site. Existing miner's gate	Same as Alt 2	Botanical Protection Measure All General Requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Ruby Group (Placer) UNF	T. 09 S.- R. 35 E. Sec 16,22 Ruby Creek/Lightning Creek- (3 acres)	Not specified	Backhoe, trommel, pumps, generator, hand tools, pickup	Action: Exploration of the bank area along Ruby creek. Will process 1-2 cubic yards per 8' deep hole for a total of 2-5 yards per year. Continued use of the existing structures.	Access: Existing FS roads along with the development of existing and designated temporary roads to work the site. Existing fords on Clear and Ruby Creek. New miner's temporary ATV bridge on Clear Creek. Ford Use (June- August) Heavy equipment: 2-4 round trips per season Other vehicles: 0-2 round trips per week with a pickup for fuel and other maintenance items, but most of the crossings would be on the bridge with the ATV .	Same as Alt 2.	WRPMs, Cultural Resource Protection Measures, Transportation Protection Measure All General Requirements except lode requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Sunshine/ McWillis (Placer and Lode) WWNF	T. 10 S.- R. 35 E. Sec 02 -McWillis Gulch (3 acres)	20-80 gpm / existing reservoir on Mcwillis Gulch.	Backhoe, trommel, suction dredge	Action: Placer excavations. Up to ¼ acre will be worked at a time. @ 1000 cubic yards a year will be processed. Continued use of existing structures. Suction dredging on McWillis Gulch.	Access: Existing FS roads, existing temporary road. Existing miner's bridge and gate.	Same as Alt 2	WRPMs All General Requirements
Tetra Alpha (Placer) WWNF	T. 08 S.- R. 35½ E. Sec 25,34 and 35 Boulder Ck. (8 acres)	150 gpm / Boulder Creek.	Dozer, excavator, Loader dump truck, drills, air compressor, pumps, jaw & vibrator crusher, Chain saws, generator, trommel, welder, conveyors and final recovery	Action: Placer mining along the south side of Boulder creek with gravity processing on the north side. Up to ½ acre will be worked at a time and @ 100 cubic yards will be processed per day. Continued use of existing structures. Access: Existing FS roads, existing and temporary, development of designated temporary roads to work the site. Ford (Boulder Creek) 1 existing and 2 proposed. Existing Miner's gate.	Ford Use (2-3 months during summer) Heavy equipment: 1-3 round trips per day will haul loads of material when working. Other vehicles: 2-4 per round trips week with a pickup or ATV.	Same as Alt 2	WRPMs, Fish Protection Measures, Cultural Resource Protection Measure, Monitoring for stream crossing All General Requirements except lode requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Tetra Alpha (Mill & Lode) WWNF	T. 08 S.- R. 35½ E. Sec 25,34 and 35 Last Chance & Boulder Ck. (2 acres)	150 gpm / Last Chance Creek.	Dozer, excavator, Loader dump truck, drills, air compressor, pumps, jaw & vibrator crusher, Chain saws, generator, trommel, welder, conveyors and final recovery	Action: Milling and gravity processing of underground lode material. (@ 10 cubic yards, or until settling ponds fill in) No clean out of settling ponds is planned. Continued use of existing structures.	Access: Existing FS roads along with the development of existing temporary roads to access the adit. Existing miner's gate.	Same as Alt 2	Fish Protection Measures, Cultural Resource Protection Measure (Mill), All General Requirements except placer requirements
Troy D (Placer) WWNF	T. 09 S.- R. 35 E. Sec 01 Granite Creek- (8 acres)	Unspecified/ Miner constructed ponds in old dredging.	Backhoe or excavator, Trommel, dump truck, Wash plant, Cat, generator, travel trailer	Action: Placer mining and gravity processing of the old dredge tailings. (50 yards per day). A water filtration plant (semi-trailers) will filter the water from the settling ponds. Final mineral recovery will take place on private land. Placement of @600 ft of power line.	Access: Existing temporary roads, development of designated temporary roads to work the site. Existing miner's gate.	Same as Alt 2	WRPMs All General Requirements except lode requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Yellow Gold (Placer) WWNF	T. 08 S.- R. 35½ E. Sec 27,34 Last Chance Creek- (9 acres)	15 gpm for High banker and 80 gpm for Trommel. / Dammed Last Chance Ck. Reservoir.	Backhoe, Dozer, Loader, dump truck, Wash plant, trommel, highbanker, sluice, and pump. .	Action: Placer mining and gravity processing at the ponds. Several families will work 2 holes (50'x30'x12'deep) at a time.	Access: Existing FS roads along with the development of existing and designated temporary roads to work the site.	Same as Alt 2, except do not use road 7355055 from the 7355020 road (@ ½ mile)	WRPMs, Transportation Protection Measure All General Requirements except lode requirements
Yellow Jacket (Placer) WWNF	T. 09 S.- R. 35 E. Sec 27,34 Orofino Gulch (8 acres)	60 gpm / adit on adjacent private land.	Backhoe, dozer dump truck, trommel, pump, suction dredge, compressor, hand tools	Action: Placer mining on FS land and gravity processing on private land. Up to ¼ acre will be worked at a time. Suction dredging in Orofino Gulch.	Access: Existing FS roads, miner's private road, existing temporary roads, development of designated temporary roads to work the site.	Same as Alt 2	WRPM All General Requirements except lode requirements

FS = Forest System

CK = Creek

gpm = Gallons per minute

UNF – Umatilla National Forest

WWNF – Wallowa-Whitman National Forest

Ft – Feet

Table 2-3: Forest Service Closed, Decommissioned or Temporary Roads Proposed for Use by Miners under Alternatives 2 and 3

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
Altona	1042E1a	1042E1c	1042E1b	0.56	Native	Temporary -E	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1042E1b	1042E1a	1042M1a	0.59	Native	Temporary -E	Y	Y	
	1042E1c	1305098	1042E1a	0.21	Native	Temporary -E	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1042M1a	1042E1b	Processing	0.05	Native	Temporary -P	Y	Y	Proposed
	1305098	1305092	1041E1c	0.20	Native	FS Closed	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1305099	1305080	1305092	0.30	Native	FS Closed	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1305092	1305099	1305098	0.03	Native	FS Closed	y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
Belvadear	1305-E2	1305080	Claim	0.15	Native	Temporary - E	Y	Y	
Blue Sky/Bull Run	7300-E4a	Co 24	7300-E4b	0.11	Native	Temporary -E	Y	Y	Existing Ford on bull run Access disperse campsite
	7300-E4b	7300-E4a	Processing	0.15	Native	Temporary -E	Y	Y	Existing Ford on Swamp Creek
	7300-E4c	7300-E4a	Site 2 Blue Sky	0.02	Tailings	Temporary -E	Y	Y	
	7300-M4a	7300-E4a	Site 3 Blue Sky	0.07	Native	Temporary -P	Y	Y	
	7300-M4b	Co 24	Site 2 Bull Run	0.07	Native	Temporary -P	Y	N	Proposed Temporary Bridge – In Alt 3, replaced with 7375-M1a because placement and removal of bridge would result in a discharge.
	7375-M1a	7375-000	Site 1 Bull Run	0.05	Native	Temporary -E	Y	Y	Alt 3-gate during use

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
	7375-M1b	7375-M1a	Site 2 Bull Run	0.20	Native	Temporary-P	N	Y	Alt 3 only. Instead of bridge on 7300-M4b.
Blue Smoke	1000-E1a	1000000	Claim	0.46	Native	Temporary - E	Y	Y	Powerline Road
Bunch Bucket	1310-E2a	1310000	Site 1	0.08	Aggregate	Temporary -E	Y	Y	Access dispersed campsite
	1310-E2b	Site1,2	Processing	0.09	Native	Temporary -E	Y	Y	
	1310-E2c	Proces- sing	Site 2	0.08	Native	Temporary -E	Y	Y	
City Limits	7300-E3a	7300000	Claim	0.11	Tailings	Temporary -E	Y	Y	
	7300-E3b	7300000	Claim	0.02	Tailings	Temporary -E	Y	Y	
East Ten Cent Creek	7350050	7350000	Claim	0.06	Aggregate	FS Closed	Y	Y	OHV Trail
	7350070	7350000	Claim	0.39	Aggregate	FS Closed	Y	Y	OHV Trail
	7350-E1a	7350070	Pond	0.12	Aggregate	Temporary -E	Y	Y	Miner Install new Gate
	7350-M1a	7350050	Shed	0.32	Native	Temporary -E	Y	Y	Miner Install new Gate
Eddy Shipman	7300590	7300000	7300-E1a	0.04	Native	FS Closed	Y	Y	Existing FS Gate
	7300680	7300000	7300-E1d	0.10	Native	FS Closed	Y	Y	Existing FS Barricade.
	7300-E1a	7300590	Cabin/Adit B	0.42	Native	Temporary -E	Y	Y	Old County Road
	7300-E1b	7300-E1a	7300-E1c	0.10	Native	Temporary -E	Y	Y	
	7300-E1d	7300680	Adit A	0.07	Native	Temporary -E	Y	Y	Existing ford, Olive Creek
Grubsteak	1300-M1a	Co 24	Dig Site	0.19	Native	Temporary -E	y	Y	Existing Miner's Bridge & Gate
Hopeful 1	1035-E2a	1035012	Cabin/Claim	0.17	Aggregate	Temporary - E	Y	Y	
	1035012	1035011	Claim	0.70	Aggregate	FS Closed	Y	Y	
Hopeful 2-3	1035-E1a	1035000	1035-E1b	0.21	Aggregate	Temporary -E	Y	Y	Old Road 1035-015 Miner install new gate
	1035-E1b	1035-E1a	1035-E1d/cabins	0.08	Aggregate	Temporary -E	Y	Y	
	1035-E1c	1035-E1a	1035-E1d/filter plant	0.27	Native	Temporary -E	Y	Y	Old Road 1035-015
	1035-E1d	1035-E1b	1035-E1c	0.19	Native	Temporary -E	Y	Y	Existing Ford (Alt 2 = 2) (alt 3 = 1) Granite Creek
L&H	1305-E5a	1042950	1305200	0.29	Native	Temporary -E	Y	Y	Continuation of Rd 950

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
	1305-E5b	1305200	Adit	0.06	Native	Temporary - E	Y	Y	
Lightning Creek	1305-E6a	1305100	Final Pond	0.07	Native	Temporary - E	Y	Y	
	1305-E6b	1305100	Dig Site	0.10	Native	Temporary - E	Y	Y	
Little Cross	1000-E3a	Co 24	Campsite	0.03	Tailings	Temporary - E	Y	Y	
Lucky Strike	Only using open FS roads								
Make-it	7300-E2a	7300700	Cabin	0.37	Native	Temporary - E	Y	y	Existing Miner's gate
Muffin	7355012	7355000	Claim	0.18	Native	FS Closed	Y	y	
	7355M1a	7355012	Work Site	0.08	Native	Temporary - E	Y	y	Existing - miner will rehab
Old Eric 1&2	10000-E2a	Co 24	Campsite	0.40	Tailings	Temporary - E	Y	y	Dispersed Camp site
Olive Tone	1305-E4a	1305082	1305-E4b	0.02	Native	Temporary - E	Y	y	
	1305-E4b	1305-E4A	Pond/Mining Site	0.16	Native and Tailings	Temporary - E	Y	y	Existing Ford on Olive Creek
Rosebud 1-4	1000-E1a	1000000	Claim	0.46	Native	Temporary - E	Y	Y	Powerline Road
Royal White	1042-E2a	Pvt Rd	Upper Adit	0.11	Native	Temporary - E	Y	Y	Extension of 1042-982
	1042-E2b	Pvt Rd	Mine Bldings	0.14	Native	Temporary - E	Y	Y	Behind existing private gate
	1042-E2c	1042982	Shafts	0.06	Native	Temporary - E	Y	Y	
Ruby Group	1310-E1a	1310000	Cabin/Sites 1,2,3	0.62	Native	Temporary - E	Y	Y	2 existing fords, (Clear & Ruby) Miner proposed ATV Bridge
	1310-E1b	1310-E1a	Site 2, staging area	0.03	Native	Temporary - E	Y	Y	
	1310-E3a	1310000	Site 4,5	0.07	Native	Temporary - E	Y	Y	
	1310-E3b	1310-E3a	Site 6	0.06	Native	Temporary - E	Y	Y	
	1310-E3c	1310-E3a	Site 7	0.02	Native	Temporary - E	Y	Y	
	1310-E4a	1310000	Site 8	0.09	Native	Temporary - E	Y	Y	
Sunshine/McWillis	1305054	1305050	1305-M1s	0.40	Native	FS Closed	Y	Y	Existing miner's gate
	1305-M1a	1305054	Claim site	0.18	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab Existing Miner's Bridge,

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
									McWillis
	1305130	1305120	Diversion Dam	0.45	Native	Decommissioned	Y	Y	Use as Temporary Road
Tetra Alpha Lode	7355- M5a	7355020	adit	0.01	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab
Tetra Alpha Mill	7355011	7355000	7355011-M4a	0.31	Native	FS Closed	Y	Y	
	7355-M4a	7355011	Top Mill	0.05	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab
	7355-M4b	7355-M4a	7355011	0.03	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab
Tetra Alpha Placer	7355011	7355000	7355011-M4a	0.72	Native	FS Closed	Y	Y	
	7533012	7355000	7355011-M4a	0.42	Native	FS Closed	Y	Y	
	7355-M3a	7355011	Processing	0.27	Native	Temporary - E	Y	Y	proposed Boulder Crk ford in Alt 2 only
	7355-M3b	7355-M3a	Claim	0.06	Native	Temporary - P	Y	Y	Proposed road
	7355-M3c	7355011	Claim	0.03	Native	Temporary - P	Y	Y	Proposed Ford, Boulder
	7355-M3d	7355011	Claim	0.02	Native	Temporary - P	Y	Y	Proposed Ford on Boulder
Troy	1000-E4a	Co 24	Claim	0.05	Tailings	Temporary - E	Y	Y	Existing Gate
	1000-E4b	1000-E4a	Claim	0.11	Tailings	Temporary - E	Y	Y	
Yellow Gold	7355025	7355020	7355026	0.05	Native	FS Closed	Y	Y	
	7355026	7355025	Alternate Processing	0.11	Native	FS Closed	Y	Y	
	7355050	7355000	Claim Trail	0.61	Native	FS Closed	Y	Y	Alt 3 preferred use (gate during use)
	7355055	7355050	Claim	0.37	Native	FS Closed	Y	Y	
	7355-E2a	7355055	Processing site	0.11	Native	Temporary - E	Y	Y	
Yellow Jacket	1305-E1a	1305035	Claim	0.11	Native	Temporary - E	Y	Y	
	1305-E1b	1305-E1a	Claim/House	0.15	Tailings	Temporary - E	Y	Y	

E = Existing non-system road

P = Proposed, miner created road,
no cut or fill.

Use of Closed, Decommissioned and Temporary Access Roads

Table 2-3 displays all roads proposed for use under each alternative. The approved Plans of Operations would include a list of all access roads authorized for use by the miners.

Plan Expiration

Approval of all Plans would expire 10-years from the date of approval. Approval may be extended if they are operating within their terms and NEPA compliance is still adequate and current at the time of extension. Plans of Operations are available in the analysis file. Map 3 displays locations of the Plans of Operations under Alternative 2.

Suction Dredging Requirements Under Alternative 2

All coverage and eligibility requirements; and terms, conditions, and requirements listed in Schedules A, B, C and D of the 700PM General Discharge Permit (project file) issued pursuant to ORS 468B.050 and 402 of the Federal Clean Water Act, along with the Oregon Department of State Lands permit for recreational placer mining within essential salmon habit, where applicable, (project file), would be adhered to by all miners proposing suction dredging in their Plan of Operations.

Monitoring Under Alternative 2

The Whitman Ranger District and North Fork John Day Ranger District Minerals Administrators are responsible for completing the annual minerals inspections and review to determine if Forest Plan standards and guides, as well as the requirements in the Plans of Operations are being met. If operations are found to be non-compliant, the Minerals Administrator is responsible for assuring corrective action is taken. Depending on complexity of the operation, some of these operations are inspected twice, if not more, during the operating season. Perennial streams in the claim shall be monitored by the Forest Service for water quality, sediment, and temperature through normal compliance inspections, and reclamation inspections.

The Minerals Administrator is also responsible for reclamation reviews. These reviews assure that requirements in the reclamation plans are being properly implemented and completed in a timely manner. A monitoring program would be accomplished on a yearly basis following mining to determine vegetation response, soil stability, and the impact of roads on water quality. Reclaimed areas would be monitored to identify areas of instability and detrimental compaction. These areas would be improved to meet Forest Service standards.

At the same time, the implementation of the PACFISH standards and guidelines for Minerals Management (MM-1 and MM-2) would also be monitored during annual inspections (Table 2-4). If there are any noticeable impacts to resources, including a discharge of fine sediment into live streams,

the operations would be stopped immediately and not allowed to resume until corrected. Additionally, annual monitoring would determine if applicable PACFISH direction has been followed. Screening for annual monitoring includes verification that:

- Applicable standards and guides and other regulations have been incorporated into Plans of Operation.
- Requirements developed during project-specific consultation have been incorporated into Plans.
- The Plans contain stipulations for modification, including reclamation requirements and bond amounts.
- For surface-disturbing activities, that reclamation requirements are included, and that a bond is in place.
- Reclamation requirements in the permit provide for needed short- or long-term monitoring and maintenance of the reclaimed project site.
- The Plan of Operations meet the PACFISH riparian management goals and objectives and avoid adverse impacts to listed species and their habitat.
- Terms and conditions in the NMFS and USFWS Biological Opinions have been met

Annual inspections would also examine the following:

Table 2-4: Annual Inspection Items

Item	Action
Equipment and Structures	List sizes and take photos of all
Earthwork	A) Excavations (testing and mining hole sizes and note if current work) B) Processing site (size of compacted area not including settling ponds) C) Settling ponds (sizes, if they are holding water, if they have been cleaned out, and if there is vegetation) D) Camp area (size of area being compacted by camping) E) Roads (lengths of any accesses to sites, condition)
Water	List if there are any overflows, muddy water, distance of workings to water, etc. Inspect fords to ensure fish passage is not impaired or blocked.
Suction Dredging	Inspections will ensure compliance with federal laws, regulations and policies (eg. 36CFR 228.4 (a) (4), and 228.4 (e)). Resource concerns and damage will be documented in every inspection. The state of Oregon (DEQ and DSL) is responsible for ensuring compliance with its permits.
Weeds	List if there are weeds, identify if possible, take picture if you are unsure, take a measurement of area, and GPS

Item	Action
Access	List all the roads and numbers to get to the site
Sketch Map	Include conversations, any campers on site, any other uses of sites for records. This is also an area for photo references from the sketch map. Also list any non-compliance issues.

Current regulations allow the district ranger to stop all operations that are noncompliant with the operating plan or the result of an unforeseen significant disturbance (36CFR 228.4 (a) (4), and 228.4 (e)). An example of an unforeseen significant disturbance could be a discharge of sediment into the stream as the result of a large flood. A discharge of this nature would be determined if the inspectors observed sediment discharging into streams or saw evidence of discharge, such as rills and gully development, from the operating area to adjacent streams, or the development of seepage zones along streambanks related to ponds.

BMP Monitoring

Additional monitoring will occur using the 2012 BMP Sampling and Monitoring protocol (2012 BMPs-Appendix G) based on the number of active mines each year. A minimum of two mines or 25% of active operations, not to exceed a total of four each year, would be monitored under the current 2012 protocol. Mine operations that are LAA fisheries resources would be targeted and one to three random sites would be chosen for sampling each year.

Stream Monitoring

The Forest Service will conduct a random sampling inspection of suction dredging activities during each season to ensure that the miners are in compliance with their Plan of Operations. A daily monitoring log referenced in the 700PM permit is required to be kept by all miners conducting suction dredging activities, and must be legible and available to the Forest Service upon request.

Plan disturbance levels shall be monitored to assure applicable components of the Plan of Operations are adhered to.

Method: Inspection

Frequency: Ongoing throughout the operating season, no less than one inspection annually.

Duration: All active periods of operations

Coordinator: Minerals Administrator

Threshold: If disturbance levels are exceeded, the occurrence shall be documented and appropriate action taken to correct the situation.

Monitor to determine if prescribed erosion control methods are in place and effective.

Method: Partial inspection, concentrating on areas with high probability of failure

Frequency: preseason, at seasonal closure, and after major rain events.

Duration: Until disturbed areas have revegetated

Coordinator: Minerals Administrator

Threshold: If combination of failure of cross drains and/or seeding is leading to gully erosion, appropriate maintenance shall be performed.

Noxious Weeds Monitoring (Implementation and Effectiveness)

1) Frequency of Monitoring and Responsible Party

Meet the requirements of the Region 6 - 2005 Preventing and Managing Invasive Plants EIS and ROD.

- The District/Zone Minerals Program Administrator shall be responsible for the monitoring for compliance with prevention standards outlined in the Region 6 - 2005 Preventing and Managing Invasive Plants EIS and ROD.
- The miner, the District/Zone Minerals Program Administrator, and the District/Zone Invasive Species Coordinator shall share responsibility for annual inspections of the site and haul routes for noxious weed infestations. The inspections shall continue for five years after a plan has terminated.
- The District/Zone Invasive Species Coordinator shall be responsible for the inventory of all noxious weed infestations that occur on the project site which are reported to him/her.
- The District/Zone Invasive Species Coordinator shall be responsible for monitoring noxious weed presence (following initial report), population size, density, new occurrence, and treatment.
- The District/Zone Invasive Species Coordinator shall inspect all roads to be closed for noxious weed infestations (and inventory/early treatment if necessary) prior to road closure.

2) Effectiveness of Noxious Weeds prevention, monitoring and mitigation

The District/Zone Invasive Species Coordinator will provide cursory evaluation of mitigation measure and treatment effectiveness as district/zone wide data is compiled for reporting purposes. Periodic (5-10 year) Forest reviews will provide in-depth evaluation of mitigation measure/treatment effectiveness.

3) Thresholds

If more than 40 spot infestations, or more than 30 acres of disturbed site become infested with a high priority noxious weed species, mitigation measures and treatment strategy will need to be re-evaluated.



This page intentionally left blank.

Alternative 3 – Plans of Operations as submitted by the Miners with Forest Service Requirements

- Authorizing approval of 28 mining Plans of Operations
- Authorizing use of 4.18 miles of previously closed or decommissioned Forest Service roads (3.73 closed and .45 decommissioned)
- Authorizing use of 8.21 miles of existing miner-created temporary roads
- Authorizing use of 0.43 miles of new temporary roads created by the miner whether by blading or continued travel
- Authorizing use of 8 existing fords on FS closed or existing miner-created roads
- Authorizing construction of 1 new ford (1 ford at Tetra Alpha Placer)
- Authorizing placement of 1 temporary bridge to be removed at the end of each operating season (Ruby Group)
- Authorizing installation of 2 new gates (East Ten Cent Creek)
- Inclusion of Forest Service Requirements in Plans of Operations for protection of water quality, soils, fisheries and other resources
- Inclusion of Monitoring Measures in Plans of Operations

This alternative includes the 28 Plans identified in Alternative 2. The Plans of Operations included in this alternative are in the analysis file. Summaries of each proposed Plan of Operations can be found in Appendix 8.

All Plans would contain a variety of requirements to meet 36 CFR 228 Subpart A. All operations must meet all other applicable State and Federal laws, including but not limited to the Clean Water Act, the National Historic Preservation Act, the Archaeological Resource Protection Act, the Endangered Species Act, and all applicable State and Federal fire regulations.

Monitoring requirements are specific to each Plan, except where State and Federal laws and regulations apply.

Map 3 displays locations of the Plans of Operations under Alternative 3.

401 Certification for Activities with the Potential for a Discharge

When an activity in a proposed Plan has been identified by the project hydrologist as having the potential for a discharge, 401 certification from ODEQ must be presented to the Forest Service prior to approval and commencement of that mining activity. Any additional terms and conditions included in the 401 certification related to that activity will be incorporated into the Plan.

Use of Closed, Decommissioned and Temporary Access Roads

Table 2-3 displays a list of roads proposed for use under each alternative. The approved Plan of Operations will include a list of all access roads authorized for use by the miner.

Plan Expiration

Approval of all Plans would expire 10 years from the date of approval. Approval may be extended if they are operating within their terms and NEPA compliance is still adequate and current at the time of extension. The complete Plans of Operations are available in the analysis file. Summaries and sketch maps of the Plans can be found in Appendix 8.

Inclusion of Forest Service Requirements

Unlike Alternative 2, under this alternative, additional Forest Service Requirements would be added to the Plans of Operations for protection of water quality, soils, fisheries and other resources. These Requirements include: General Requirements (Appendix 2), Site-Specific Water Resource Protection Measures (WRPMs) (Appendix 1A), and other protection measures and monitoring, all of which are described below.

General Requirements

In addition to the protection measures and reclamation plans submitted by the miners under Alternative 2, each Plan would include General Requirements to meet minerals regulation 36 CFR 228 Subpart A (228 Regulations) that are specific to each Plan's activities (Appendix 2).

Site-Specific Water Resource Protection Measures (WRPMs)

Site-Specific Water Resource Protection Measures (WRPMs) would be identified for those operations that may result in a discharge into navigable waters or the broader waters of the State (Appendix 1A). The intent of this alternative is to "minimize adverse environmental impacts on National Forest System surface resources" (228 Regulations), and to meet the intent of the Clean Water Act.

Suction Dredging Requirements

The suction dredging requirements are the same as described for Alternative 2. All coverage and eligibility requirements; and terms, conditions, and requirements listed in Schedules A, B, C and D of the 700PM General Discharge Permit issued pursuant to ORS 468B.050 and 402 of the Federal Clean Water Act, along with the Oregon Department of State Lands permit for recreational placer mining within essential salmon habit (where applicable), would be adhered to by all miners proposing suction dredging in their Plan of Operations.

Site-Specific Fisheries Protection Measures

Protection of fish habitat and fish is embedded in PACFISH (MM1-MM6 and Riparian Management Objectives) (WWNF and UNF Forest Plans), State of Oregon 700PM permit, Oregon Department of State Lands (DSL) permit, Forest Service WRPMs (Appendix 1A), General Requirement G23 (where applicable), and the following Plan-specific protection measures:

Belvadear Placer

1. If a stream is dry below where the miner is working prior to August 15, then the miner must cease withdrawing water from the creek until flow exceeds the amount withdrawn.

Hopeful 2-3 (Placer)**Fords**

1. Channel bed must be stable and water depths must be below the frame on the vehicle before the ford can be used in order to ensure that equipment can safely cross.
2. East ford, North approach: Rock the north approach to the slope break plus 25 feet of additional road. East Ford south approach (map of road segments in Hydrology report):

Segment A: Rock the road

Segment B: The road steepens for about 35 feet to reach the top of the hill. Place a water bar at the base of the steep section of road where there is a 2.5 foot wide flat area on the stream side of the road. Forest Service Minerals Administrator will be on site and verify water bar locations prior to construction. Design the water bar so that it diverts towards the flat area (only option as the other side is a hill slope). Place straw bales at the stream side edge of the flat area to trap all sediment leaving the road and preventing it from entering the creek. Do not rock this section because rock will only fill the water bars.

Segment C: A water bar will be placed where the road flattens out. Forest Service Minerals Administrator will be on site and verify water bar locations prior to construction. This portion of the road will be rocked.

3. Ford unnamed tributary on the south side.
 1. Rock both approaches to where 1) the road flattens out (east side) or there is a change in slope (west side)
 2. Leave existing corduroy bridge in the channel.

Lightning Creek Placer

1. No water withdrawals are permitted in Lightning Creek after August 15 to protect fish migrating to spawn.
2. If a stream is dry below where the miner is working prior to August 15, then the miner must cease withdrawing water from the creek until flow exceeds the amount withdrawn.
3. On Lightning Creek water pump intakes should be screened with 3/32" plate screen (or equivalent) to avoid entrainment and/or intake of juvenile fish.

Olive Tone Placer

1. If a stream is dry below where the miner is working, then the miner must cease withdrawing water from the creek until flow exceeds the amount withdrawn.
2. See General Requirement G23. This is a protection measure used when withdrawing water from Olive Creek or Quartz Gulch.

Rosebud 1-4 Placer

1. Miner would limit loss of water in the processing pond to no more than 6 inches of water during daily operations.

Tetra Alpha Placer

1. A fisheries biologist or minerals administrator would monitor stream crossings to ensure that constructed fords do not create a fish barrier during low flows.
2. No water withdrawals are permitted in Boulder Creek after August 15 to protect fish migrating to spawn.
3. If Boulder Creek is dry below where the miner is working prior to August 15, then the miner must cease withdrawing water from the creek until flow exceeds the amount withdrawn.

Tetra Alpha Mill and Lode

1. No water withdrawals are permitted in Boulder Creek after August 15 to protect fish migrating to spawn.
2. If Boulder Creek is dry below where the miner is working prior to August 15, then the miner must cease withdrawing water from the creek until flow exceeds the amount withdrawn.

Transportation Protection Measures**Blue Sky/Bull Run**

To prevent the public from using temporary mine access Road 7355-M1a, the miner will maintain the berm as an effective road closure, or if multiple trips will be made on Road 7355-M1a throughout the season, the miner will install a gate according to Forest Service specifications (project file).

Eddy Shipman

To prevent the public from using closed Road 7300-680, the miner will maintain the berm as an effective road closure, or if multiple trips will be made on Road 7300-680 throughout the season, the miner will install a gate according to Forest Service specifications (project file).

Ruby Group Placer

For safety reasons and to prevent the public from using the miner's ATV bridge on temporary mine access Road 1310-E1a, the miner will install a sign stating "Mining use only – ORMC - claim number

XX". The miner will also install a gate in front of the bridge according to Forest Service specifications (project file).

Yellow Gold Placer

To prevent the public from using closed Road 7355-050, the miner will maintain the berm as an effective road closure, or if multiple trips will be made on Road 7355-050 throughout the season, the miner will install a gate according to Forest Service specifications (project file).

Botanical Protection Measures

Royal White

1. To preclude the possibility of any severe damage (e.g. direct mechanical destruction of plants or soil compaction) to the population of *Lomatium tarantuloides* at the Royal White site by inadvertent forays into the area by mining equipment, the miner will not breach the area protected by fallen trees immediately adjacent to Forest Service Road 1042970 that transects the population. Prior to commencement of mining activities, the Forest Service will fall small trees or install another type of barrier around the area to be avoided and protected.

Cultural Resource Protection Measures

Blue Sky 2

To protect and preserve the historic integrity of the hand-piled tailings adjacent to the south side of the Blue Sky 2 work area, conduct mining activities to avoid the hand-piled tailings adjacent to this work area with a 30-foot buffer. The hand-piled tailings are not located within the proposed work area.

Bunch Bucket

To protect and preserve the historic integrity of the two historic sites located on the edge of the work area, the operator will avoid the sites with a 30-foot buffer. The two historic sites are not located within the proposed work area.

To protect and preserve the historic integrity of the cabin, shed and outhouse, all of which are owned and used by the miner for Plan activities, the operator and Forest Service will work together to maintain the historic appearing character of the existing buildings.

Hopeful 1

To protect and preserve the historic integrity of the two-room cabin and outhouse, both of which are owned and used by the miner for Plan activities, the operator and Forest Service will work together to maintain the historic appearing character of the existing buildings.

L&H Placer/Lode

The historic structure (collapsed cabin remains) at the site is potentially eligible for the National Register of Historic Places. Before any mining work can be completed within 30-feet of the cabin remains, or in the cabin remains themselves, a determination of eligibility would need to be made. If the cabin remains are

determined to be eligible for the National Register (a likely outcome), mitigation would be required for any mining work that would cause an adverse effect to the cabin remains. Mitigation measures would need to be consulted upon with the Oregon State Historic Preservation Office and possibly the Advisory Council on Historic Preservation. Mitigation would need to be funded by the mining operator.

Lightning Creek Placer

The historic mining site is being considered eligible for the National Register of Historic Places (NRHP). To protect and preserve the historic integrity of the seven historic structures proposed for use on the site, the operator and Forest Service will work together to maintain the historic appearing character of the existing structures.

Lucky Strike Placer/Mill

The historic mining site is being considered eligible for the National Register of Historic Places (NRHP), with the north end non-contributing to eligibility, and the south end with contributing standing structures.

For the north end of the site, where current mining work is planned in adits/shafts, no protection or preservation is necessary. No actual mining work is planned for the south portion of the site, but maintenance and possible restoration of the historic cabin and stamp mill are planned. To protect and preserve the historic integrity of the cabin and stamp mill, the structures should be maintained with historic appearance, and any work to be done should meet the Secretary of Interior Guidelines for Historic Preservation. If plans are proposed that would adversely affect the structures, mitigation would be necessary. Mitigation measures would need to be consulted upon with the Oregon State Historic Preservation Office and possibly with the Advisory Council on Historic Preservation. Mitigation would be funded by the mining operator.

Make It Placer

To protect and preserve the historic integrity of the historic structures and remains on the site, the operator will avoid all structures and remains (cabin, pole structure, footbridge, trash dumps and debris, dam/pond, and car parts) with a 30-foot buffer. The structures and remains are not located within the proposed work area.

Ruby Group

To protect and preserve the historic integrity of the historic collapsed structures and features during mining activities, the operator will avoid the structures and features with a 30-foot buffer. The structures and features are not located within the proposed work area.

Tetra Placer and Mill

To protect and preserve the historic integrity of heritage sites on the access road to the planned work areas, FS road 7355-010 used to access the work areas will not be widened, and any work on the road will require pre-approval by the Forest Service. The mine operator will be allowed to drive on the open Forest Service Road 7355-010, however the operator has not proposed any mining activity within 30 feet of the sites.

Monitoring

Monitoring and annual inspections by the Forest Service are the same as described under Alternative 2, but also include the additional evaluation of the Forest Service Requirements (including those for cultural resources) to determine if the miner has implemented these measures and requirements, and that they are achieving the desired results. In addition, two additional monitoring measures are included in Alternative 3.

Tetra Alpha Placer

A fisheries biologist or hydrologist would monitor the three stream crossings to ensure that constructed fords do not create a fish barrier during low flows.

Monitoring Closed Sites

Once an operation is closed (all proposed actions are complete), annual inspections by a Forest Service biologist or minerals administrator would occur the first three years and then and then every 5-10 years after, depending on the type of reclamation work done, to ensure that reclamation activities are complete and successfully implemented.

Comparison of Alternatives

The difference between Alternative 2 and Alternative 3 is the difference between what was proposed in the Miner's Plan of Operations, as submitted by the miner, and what the Forest Service proposed as changes to the miner's proposal. Under Alternative 3, all Plans would include Forest Service Requirements: General Requirements (Appendix 2), Site-Specific Water Resource Protection Measures (WRPMs) (Appendix 1A), and other protection measures and monitoring. Alternatives 2 and 3 also include proposals for use of Forest Service roads for mine access that are currently either closed or decommissioned, or are temporary non-system roads. Some of the roads proposed for use differ between Alternatives 2 and 3.

Refer to Table 2-2 above for a comparison of the operations by alternative.

Tables 2-5 through 2-7 display a summary of impacts to issues and resources through implementation of each alternative.

Table 2-5: Comparison of Effects to Water Quality Issues/Key indicators for Water Quality

	Alternative 1	Alternative 2	Alternative 3
# of Plans Operations with potential to discharge sediment into a creek	4	16	2
# of Plans Operations with potential to discharge heavy	0	3	0

	Alternative 1	Alternative 2	Alternative 3
metals into a creek			
# of Plans of Operations with potential to discharge warm water	0	1	0
# of Plans of Operations with potential to discharge creosote	2	0	0
# of Plans Operations with potential to alter stream temperatures	0	5	5
# of Plans Operations with potential to alter stream flow	0	5	5

Table 2-6: Comparison of Alternatives for Fish Issues/Key indicators for Fish

Key Indicator	Alternative 1	Alternative 2	Alternative 3
# of Plans of Operations with stream fording	0	9	9
# of Plans of Operations with suction dredging in fish habitat	0	5	5

Table 2-7: Effects on Threatened, Endangered, and Sensitive Fish Species

Key Indicator		Alternative 1	Alternative 2	Alternative 3
# Plans of Operations with adverse effects to ESA Listed Fish Species and/or their Designated Critical Habitat	Bull Trout # of Plans	0	13	9
	Mid-C steelhead # of Plans	0	18	11

Preferred Alternative

Alternative 3 is the agency preferred alternative.

Chapter 3 – Affected Environment and Environmental Effects

Chapter 3 describes the environment and environmental effects as described by the existing condition, direct, indirect, and cumulative effects relevant to this analysis and concludes with a discussion of specifically required disclosures.

This chapter presents the relevant resource components of the existing environment – the base line environment. It describes the resources of the area that could be affected by the alternatives and discloses the environmental effects of implementing the alternatives. These form the scientific and analytical basis for comparing the alternatives described in Chapter 2.

It focuses on the resources that are relevant to or affected by the scope of the analysis: Water Quality and Soils, Fisheries, Wildlife, Invasive Species, Botany, Access/Transportation, Recreation, Roadless and Potential Wilderness Areas, Visuals, Social/Economics, and Cultural Resources. Acre totals are approximate within tables and text due to rounding.

This DEIS incorporates by reference the Resource Specialist Reports in the Project Record (40 CFR 1502.21). These reports contain the detailed data, executive summaries, regulatory framework, assumptions and methodologies, analyses, conclusions, maps, references, and technical documentation that the resource specialists relied upon to reach conclusions in the DEIS.

Cumulative Actions and Activities

Cumulative effects are analyzed in this chapter. Each resource area identifies the specific actions and activities that were considered to overlap with the direct and indirect effects of the proposal and alternatives. The actions and activities considered for cumulative effects are shown in the following table.

Table 3-1: Past, Present and Reasonably Foreseeable Actions within the Analysis area

P = Past, O = Ongoing, F = Future

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
P	Bull run Culverts Decision signed 6/24/13	WWNF	<p><u>Bull Run Culvert/Corrigan Springs (7375 Road) T. 9 S, R. 36 E., Sec. 19):</u></p> <p>The existing culvert was removed and disposed of off National Forest System land and replaced with an</p>

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
			appropriately sized structure to meet a 100-year flood event and allow fish passage. New culverts have an open bottom design with concrete footings.
P	Culverts on 10 Cent Creek	UNF	Three culverts on Ten Cent Creek were replaced in 2012 for fish improvement.
F	Granite Culvert Replacements	WWNF	This project proposes to remove and replace 7 culverts with fish passage friendly structures throughout the area around the town of Granite, OR. Projected implementation summer 2015.
P	Storm Damage Risk Reduction (SDRD)	UNF	SDRD – (Storm Damage Risk Reduction). Culvert replacement and other drainage improvements on the 1035 1038, and the 7335 road systems. (Fortifying road edges, planting trees and shrubs, improving ditch lines and drainage dips, and restoring unusable roads beds to forested land.)
P, O	Road use and Road Maintenance	WWNF & UNF	<p>The analysis area has an extensive Forest Service road system that was built during the period of large-scale logging which took place in the 1960s and 1970s</p> <p>Road maintenance is an ongoing activity. The main gravel roads receive surface maintenance usually once a year. On about a 5-year schedule, all other roads get inspected for deferred maintenance. Problems identified during inspections are taken care of within the year.</p> <p>Over 6 miles of road were decommissioned (full obliteration) with Legacy Road funds in 2008 in Lower Granite Creek.</p>
P, O, F	Invasive Species Management	WWNF & UNF	The WWNF and UNF both completed Invasive Plants Treatment FEIS's and ROD's in 2010. The WWNF ROD is currently under litigation, but certain types of treatments are still allowed (see Invasive Species section below). Both forests will continue to implement treatments to prevent the introduction and spread of noxious weeds.
P, O	Fire, Fuels Reduction and Timber Harvest	WWNF & UNF	<p>Greenhorn Thinning (ongoing) and Granite Interface (past – 2004)</p> <p>Granite WUI – Ten Cent fuels area – Blue Mtn Forests fuels reduction project:</p> <p>This work may include; setting of prescribed fires to improve the composition, structure, condition and health of stands or improve wildlife habitat, removing vegetation or other activities to promote healthy forests, reduce fire hazards, or achieve other land management objectives, watershed restoration and maintenance, restoration and maintenance of wildlife and fish habitat, control of noxious weeds and exotic weeds, and re-</p>

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
			establishment of native plant species.
O	Dispersed Recreation	WWNF & UNF	The project area is used recreationally for hunting, hiking, berry picking, firewood cutting, dispersed camping and picnicking, snowmobiling, cross country skiing, and OHV use. A portion (3,021 acres) of the Vinegar Hill/Indian Rock Scenic Area lies within the analysis area, and includes several hiking (non-motorized) trails.
O	Developed Recreation – Olive Lk. Campground,	UNF	Olive Lake Campground is the only developed campground within the analysis area. There are 26 campsites, 2 day use sites, a fishing platform, boat ramp/dock and a 2.5 mile hiking trail around the perimeter of the lake. Fishing, boating, picnicking, overnight camping, and hiking are popular activities at this site.
O	Trailheads	UNF	The Saddle Camp/Lost Creek Trailhead (T9S, R35E, s14) is the only developed trailhead accessing the scenic area within the analysis area. Facilities include a graveled parking pad, signing and a bulletin board. Granite Creek Trail Head (T8S, R35E, s20) access the wilderness area. Has a gravel parking area and a bulletin board Ben Harrison Trail Head (T9S, R35E, s22) this is an undeveloped site which access the wilderness. Olive Lake Trail Head (T9S, 34E, s15) this trail head is located in the Olive lake Campground and access Saddle camp and the lost Creek trail.
O	Recreation Rentals – Fremont Powerhouse	UNF	The turn of the century Fremont Powerhouse site is a popular location for visitors to learn more about the area's early mining history. The four old employee houses are part of the cabin rental program and are available for rent thought out the year. The site will continue to have occasional administrative use as well and all houses may not be available for rent at one time.
P, O, F	Recreational Special Use Permits	WWNF & UNF	Throughout the years there have been occasional Special Use Permits (SUP) for a recreational event and/or outfitter guide services. To date, there are currently no SUP's authorized in the analysis area. As new request are received they will be evaluated and analyzed at that time.
O	Long-term Special Use Permits	WWNF & UNF	Currently, there are only a few lands related Special Uses in the Granite watershed area. These consist of power, electrical and water transmission lines to the local communities and residences of the area. They include the City of Greenhorn Water transmission line, Pine Telephone phone transmission line, and OTEC

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
			(Oregon Trails Electric Company) power transmission line (project file).
O	OHV use	WWNF & UNF	On the WWNF, with the exception of the North Face Vehicle Closure, the entire area is open to motorized travel including off-road travel. All maintenance level 1 roads (closed roads) are open to off-road vehicles. On the Umatilla NF, there are no designated OHV (Off Highway Vehicle) trails in the area. However, OHV activity is permitted and does occur on open roads in the analysis area. This includes riding motorcycles (Class III) and four-wheelers (Class I) on these roads. With the exception of Forest Service Road 10, all open roads within the analysis area are open to OHV travel, per the 2001 Interim Program for ATV/OHV Strategy on the Umatilla National Forest (UNF). Additionally, the 1000460, 1000520, 1010370, 1035060, 1035080, 1038060, 7350050, 7350052 and 7350070 are forest system roads open seasonally to OHV use but closed to other motorized trails. Note that State law does not allow ATV use on two lane roads. All double digit roads 73, 10 etc are considered two lane roads and not useable to ATV's unless they are highway certified.
O	Snowmobiling	WWNF & UNF	On the WWNF, several miles of designated snowmobile trails occur within the area. These trails utilize snow-covered forest system roads that are mechanically groomed (snow-packed). The designated trails are used by snowmobiles during the winter months, generally December through the middle of March. Occasionally, snowmobilers use non-designated roads. On the Umatilla NF, Forest Service Road 10 is groomed for snowmobile use from the junction of Rd. 13 and Rd. 10 to Desolation Guard Station. All of FS Rd. 10 within the analysis area serves as a groomed snowmobile trail during the winter months. A local snowmobile club grooms the trail (Rd. 10) when there is adequate snow coverage, typically between the months of December and March. Because snowmobile use would occur outside of the time when miners typically operate, there would be no measurable impact to snowmobile activity from the action alternatives.
P	Grazing	WWNF & UNF	Inactive Range Allotment – Camp Creek C&H Allotment. No ongoing grazing in the watershed.
P, O, F	Notice Level Mining	WWNF & UNF	Approximately 1 – 4 Notice of Intent (NOI) requests for mining operations are submitted to the Forests per year. These are typically small- scale activities and last for one summer or less (testing, panning, pick and shovel work). Activities larger in scale and longer term are required to provide Plans of Operations. Due to the current gold market, it is expected that NOI's will

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
			continue to be submitted in the future and they will be reviewed by the District Rangers as they are received.
P, O	Private Land activities	WWNF & UNF	Granite and Greenhorn – Cabins, Residences, Past Harvest small-scale timber harvest. ODF regulates timber harvest on private land. Private lands within and immediately adjacent to the Granite Mining analysis area are forested tracts, similar to Forest Service and BLM ownership lands. These areas generally experience minimal harvest. Some mining activities occur on private land, and are mostly limited to what the land owners can do on their own.
O, F	Redboy Mine Restoration Improvements - NFJD Watershed Council and Forest Service	UNF	<p>Ongoing maintenance and repair of the pipeline and settling ponds. In 2013 the piping system to move the water from the adit to the settling ponds was upgraded and replaced.</p> <p>The EE/CA completed by Cascade Earth Systems found that arsenic concentrations on lower Clear Creek are slightly above Oregon DEQ criteria for toxic pollutants. Other dissolved metal concentrations in surface water were below the minimum detection level (MDL) of 50µg/L. Sediment concentrations of arsenic are above the EPA Threshold Effect Levels. Sediment concentrations of copper, cadmium, manganese, nickel and zinc are also in excess of state and/or federal comparison criteria. The Clear Cr. WRAPs addresses essential project work for ongoing water quality monitoring.</p> <p>Additional evaluations are needed and the site was placed on Confirmed release list in 2003.</p>
F	CERCLA investigations	WWNF & UNF	CERCLA site identified for investigation that overlap proposed Plans include Eddy Shipman from the historic Central and the East Eddy adits.
P, O	AML mine restoration and reporting	WWNF & UNF	<p>State and local agencies are continuing clean up and conduct rehabilitation work areas outside of the proposed Plans in the Granite Creek watershed. Watershed monitoring and assessment work is being conducted through a contractor on Clear Creek. Work at the Red Boy Mine continues. Granite Creek received some stream side restoration in 2013 and other areas are being considered for future restoration. The Beaver Creek and Clear creek junction received soil in which vegetation and trees were planted in order to restore that area.</p> <ul style="list-style-type: none"> Over 100 historic and or abandon mines exist in the Granite Creek Watershed. Inventory and

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
			<p>assessment work of these mines is ongoing.</p> <ul style="list-style-type: none"> Between 2001 and 2007, 2 miles of Granite Creek and 3 miles of Clear Creek had restoration work done on the dredge trailing in order to return them to a more natural condition and improve stream habitat. Restoration included planting of 5000 shrubs, hardwoods, and conifers, and approximately 400 lbs of native seed. In 2013 the Watershed council and the CTU did a stream restoration project on the private land section of Granite Creek near the junction with Clear Creek. Redboy Mine (see above). Blue Bird and Black Jack Mines - Annual maintenance on the outlet pipes and the settling ponds for the acid drainage from the adits. In accordance with the CERCLA act a number assessment reports have already been completed in this area but there is still more to do.
P, O	Ditches	WWNF & UNF	Approximately 30 miles of existing ditchlines, mostly on WWNF used for irrigation, none of which are currently under special use permits with the Forest Service.
P	Historic Towns – private land	WWNF & UNF	The historic mining towns of Granite and Greenhorn still exist today, but currently cater more to tourist and summer homes. Sumpter to the south has a state park, and along with the Fremont Power House is part of the historic dredge tour.
O	Olive Lake Dam Improvement	UNF	<p>In 2013 all debris was removed from the entrance of the Olive Lake spillway. A new debris boom replaced the old debris boom at the same location. The log boom was placed with two 75-foot floats linked in a “V” shape.</p> <p>In the future, as funding is available, the spillway will be reshaped to its original elevation and configuration and then lined with riprap. Vegetation will be cleared from the spillway; currently, vegetation is trapping sediment, which reduces the spillways capacity. The lakeside face of the dam will also be lined with riprap. This maintenance work will include in-water work or placement of material along the face of the dam and spillway locations.</p>
O	Vinegar Fire & recovery	UNF	About 1500 acres burned from a lightning caused fire in the Vinegar Hill and Salmon Creek area in the fall of 2013. A number of restoration measures were put into place before winter and the area was monitored in

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
			2014 for any additional needs.
P,O, F	Noxious Weed control	WWNF & UNF	Yearly weed treatments of known sites is conducted on the WWNF and UNF through a programmatic EIS. As new sites are found, they are documented, monitored and treated.

To understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environments to the present.

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions because there is limited information on the environmental impacts of individual past actions, and one cannot reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions may risk ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, “agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.”

The cumulative effects analysis in this EIS is also consistent with Forest Service National Environmental Policy Act (NEPA) regulations (36 CFR 220.4(f), July 24, 2008), which states in part:

CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal of agency action or its alternatives will add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered, (including past, present, and reasonable foreseeable future actions) on the affected environment). With respect to past actions, during the scoping process and subsequent preparation for the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some context be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalog or exhaustively list and analyze all individual past

actions. Simply because information about past may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decision-making (40 CFR 1508.7).

For these reasons, the analysis of past actions in this section is based on current environmental conditions unless otherwise noted.

Water and Soil Resources

Introduction

This section describes the existing condition of the Water and Soil resources in the Granite Creek Mining Analysis Area based on field visits and information from the Granite Creek Watershed Analysis Report (*USDA Forest Service 1997*) in which the historic and current conditions of the soil and water resources are discussed.

Scale of Analysis and Affected Environment

Watershed

The Granite Creek Mining Analysis Area is located in northeastern Oregon, in the Granite Creek Watershed (10th field HUC 1707020202). The Granite Creek Watershed is comprised of 40,857 acres on the Wallowa-Whitman National Forest (WWNF), 49,262 acres on the Umatilla National Forest (UNF), and 4,407 of private land and 167 acres of Malheur NF. This watershed centers around Granite Creek, a headwater tributary to North Fork John Day River, which lies within the John Day River Basin (6th field HUC 170702). The Granite Creek HUC 10 watershed consists of six HUC 12 subwatersheds (**Table 3-2**). Location of the 2010 NHD subwatersheds are shown in Map 4 found in the Fisheries section of this chapter.

Table 3-2: 2010 NHD Subwatersheds within the Granite Watershed

SWS Name	SWS Number	SWS TOTAL Acres	SWS TOTAL sq. miles	WWNF Acres	UNF Acres	Private/ Other Acres	% NFS Lands
Beaver Creek	170702020203	13,078	30.31	12,104	16	958	92.7
Bull Run Creek	170702020202	19,400	31.98	18,765	0	635	96.7
Clear Creek	170702020204	20,468	18.65	1,562	17,682	Private: 1,057 and Malheur NF: 167	94.8
Lake Creek**	170702020205	11,937	31.69	0	11,884	53	96.8
Lower Granite Creek	170702020206	20,283	14.55	1,055	17,954	1,274	93.7
Upper Granite Creek	170702020201	9,314	147.63	7,138	2,003	173	98.2
TOTAL ACRES		94,480	20.43	40,624	49,539	4,317	

** The Lake Creek subwatershed has no proposed Plans of Operation and therefore is not discussed further. Plans of Operation are proposed in the other five subwatersheds.

Current and Historic Land use

The primary human impacts to the watershed include historic and ongoing beaver trapping, mining (lode and placer), water diversions, timber harvest, road construction, historic domestic livestock grazing, ongoing motorized recreation, and human habitation. Hazardous fuels and Wildland Urban Interface (WUI) designation in the vicinity of Granite (extreme hazard rating) make this area a priority for fuels reduction. There is no livestock grazing currently permitted on the National Forest (the Camp Creek allotment was vacated in 2006). Effects from natural disturbances including wildfires and insect and disease epidemics are also present in the watershed. It is estimated that over 100 historic and/or abandoned mines exist in the Granite Creek Watershed. Inventory and assessment of these mines is ongoing.

Restoration and reclamation work has been ongoing in the Granite Creek watershed for more than three decades, yet much remains to be done. Some actions may be one-time investments, but others will require long term investment because chronic conditions and/or severe impacts. Portions of the watershed were severely altered by dredging, hydraulic, placer and lode mining activities from the late 1890s up to WWII and on into the 1950s. Mining effects on watershed function are variable, highly complex, and fully described elsewhere in numerous reports and scholarly articles. In the 1970s and 1980s, restoration activities focused on improving instream habitat to increase pools and help ensure survival during the late summer low flow period. Numerous instream structures (log-rock weirs) were installed in tributaries to improve late summer pool habitat and hold fish. During the same time period, efforts to reclaim abandoned mines with known toxic discharge focused on diverting discharge into off-channel settling ponds. With passage of the CERCLA Act, both forests have initiated the required reporting and analysis for the abandoned mine sites in this watershed. Activities that have been or will be implemented to address priority sites is listed at <http://www.fs.fed.us/r6/uma/projects/index.shtml> and <http://www.fs.fed.us/r6/umatilla/landmanagement/planning/?cid=stelprdb5208004> for the Umatilla sites, and <http://www.fs.usda.gov/detail/wallowa-whitman/landmanagement/projects/?cid=stelprdb5287229> for the Wallowa-Whitman sites.

Restoration projects were initiated in the Granite Creek watershed in the 1970s. Between 2001 and 2007, 2 miles of Granite Creek and 3 miles of Clear Creek had dredge tailing restoration, including planting of 5000 shrubs, hardwoods, and conifers, and approximately 400 lbs of native seed mix. Over 6 miles of road were decommissioned (full obliteration) with Legacy road funds in 2008 in Lower Granite Creek, and several aquatic organism passage projects are in the planning stages (upper Granite Creek) (*USDA Forest Service 2008*).

Landform Characteristics

The Granite Creek watershed begins in the Elkhorn and Greenhorn Mountains at elevations over 8000 feet. Granite Creek and its tributaries flow to the southwest, and at its junction with Bull Run Creek, turns in a northwesterly direction to join the North Fork John Day River at an elevation of 3900 feet. The geology includes ancient seafloor volcanics and crustal ultramafics, a mix of sedimentary and metamorphic complexes, granite intrusions, a more recent series of surface volcanic flows (Columbia River Basalts), glacial moraines, and recent alluvial deposits. Minerals of interest are not limited to any one geologic formation or rock type, but can be found in all of them.

Vegetation communities in the watershed reflect the influences of climate, topography, and geologic setting, and are characterized by mixed dry pine plant communities in the lower elevations and cool-moist subalpine fir/whitebark pine in the higher elevations. Fuel conditions vary widely across the watershed but trend toward the high end of loadings partly as a result of fire suppression. Riparian vegetation types include conifer communities in smaller tributaries, grass-forb meadow types, and mixed forb-shrub communities, including black cottonwood, aspen, willow, red-osier dogwood, rocky mountain maple, wetland forbs, sedges, and a variety of grass species. The general condition of vegetation varies across the landscape depending in part on past management of the specific area (*USDA Forest Service 1997*).

Channel Morphology and Drainage Network

Drainage density is the miles of stream channel per square mile of drainage. Generally, as drainage density increases so does flow response and the size of a flood peak. Roads increase drainage densities by intercepting precipitation and subsurface flows and routing them in places directly to the channels (Wemple 1994).

Granite Creek Watershed has 221.7 miles of perennial stream and 167.44 miles of intermittent streams based on the existing Forest Service GIS layer (**Table 3-3**). As a result of past land use activities, most if not all of the streams have widened, incised, and straightened and over one third of the streams in the watershed go seasonally dry. Active floodplains are much narrower than the historic floodplains as a result of these channel changes with streams no longer flooding their valley floors on a 1-2 year basis. In some place placer tailings line the stream channel and keep it confined. In other places, such as along Bull Run Creek, roads confine the stream. Restoration work has occurred along Clear Creek and Granite Creek resulting in a redistribution of the old tailings such that portions of the channels are no longer confined between the old placer tailings piles. However, existing streams still remain isolated from these restored valley floors because the channels remain over wide and incised.

Table 3-3: Stream drainage density by subwatersheds within the Analysis Area (Forest Service GIS layer 2012).

Subwatershed	TOTAL SWS (sq. miles)	Stream Type	Stream Miles	TOTAL Stream Drainage Density (miles/sq. mile)
Beaver Creek	20.43	Intermittent Streams	15.31	
		Perennial Streams	25.59	
		TOTAL	40.9	2
Bull Run Creek	30.31	Intermittent Streams	15.95	
		Perennial Stream	58.82	
		TOTAL	74.78	2.47
Clear Creek	31.98	Intermittent Streams	43.43	
		Perennial Stream	39.82	
		TOTAL	83.25	2.6
Lower Granite Creek	31.69	Intermittent Streams	66.76	
		Perennial Streams	45.5	

Subwatershed	TOTAL SWS (sq. miles)	Stream Type	Stream Miles	TOTAL Stream Drainage Density (miles/sq. mile)
		TOTAL	112.27	3.54
Upper Granite Creek	14.55	Intermittent Streams	7.24	
		Perennial Stream	27.63	
		TOTAL	34.87	2.4
	128.96	Grand Total Miles	346.07	2.68

The amount of road length that contributes to drainage density varies depending on road drainage structure spacing and effectiveness and on the topographic setting (e.g. does the road drain into the stream from both sides or from one side). For this analysis, a conservative estimate of 200 feet of road per stream crossing (or 100 feet per side) was used when calculating the increase in drainage miles and thus drainage density as a result of road-stream crossings.

The road-stream crossings added 18.49 miles of drainage length in the five subwatersheds with the miles distributed over the five subwatersheds within the Analysis Area. The amount of percent increase in the drainage density for a given subwatershed varied from 3.8 to 9.5 % (**Table 3-4**).

Table 3-4: Expansion of the Drainage Density by Subwatersheds within the Analysis Area as a function of road and stream crossing interaction (Forest Service GIS layer 2012).

SWS Name	TOTAL SWS Drainage Area (sq. miles)	Total Road miles*	Stream miles	# Stream crossings	Drainage miles added due to road-stream crossings	Stream miles plus Road-stream crossing miles	Drainage Density without Roads (miles/sq. mile)	Drainage density with Roads (miles/sq. mile)	Drainage Density increase as a result of road crossings (%)
Beaver Creek	20.43	125.68	40.9	103	3.9	44.8	2	2.19	9.5
Bull Run Creek	30.31	146.25	74.78	132	5	79.8	2.5	2.6	4
Clear Creek	31.98	38.69	83.25	57	2.16	85.4	2.6	2.7	3.8
Lower Granite Creek	31.69	59.39	112.27	106	4.02	116.3	3.5	3.7	5.7
Upper Granite Creek	14.55	70.94	34.87	90	3.41	38.3	2.4	2.6	8.3
TOTAL	128.96	440.95	346.07	488	18.49	364.6			

*Road miles and road densities calculations based on Forest Service open and closed roads, county, state and private road miles

Precipitation

Precipitation within the Granite Creek Watershed varies with elevation and time of year (**Table 3-5**). The climate is dominated by snow during the winter season and augmented by spring rains. Precipitation records in the watershed are limited to a site at the town of Granite (ID CHCND:USC00353430). The period of record is 7/2/1948 to 10/16/1967 (Western Regional Climate Center). The site is 4944 feet above sea level.

Table 3-5: Precipitation and Snow fall data from a site at Granite, Oregon in Grant County in inches

	Jan	Feb	Mar	April	May	June	July	August	Sept	Oct	Nov	Dec	TOTAL
Av. Total PPT	3.66	2.93	2.73	1.87	2.33	1.76	0.6	.071	1.08	1.93	2.93	3.84	26.37
Av. Total snow fall	40.6	31.5	29.7	10.5	3.9	0.6	0	0	0.7	3.7	17.5	35.4	174.1

Water Quality

Aspects of water quality considered in this analysis are stream temperature, turbidity via sediment inputs from off channel, and heavy metals from adit discharges. Both stream temperature and heavy metal input issues are the result of historic land use activity. Sediment inputs are the result of both historic and current activities.

Air temperature has become the most important variable for predicting both the mean and maximum daily water temperatures and patterns of temperature changes because current streams are over-widened, incised, straightened and disconnected from their historic floodplains (valley floors). As a result groundwater tables have dropped and no longer contribute cool base flows to the streams during the summer. In addition, the loss of riparian vegetation and over-widening of the channels has eliminated much of the shade component on the rivers.

Stream Temperature

It is the responsibility of the Forest Service to address 303(d)-listed waters on National Forest System lands and to develop strategies that will improve water quality, based on the specific parameters listed. Summer stream temperatures have been collected on 12 streams in Analysis Area. The 7-day moving average of the daily maximum stream temperatures for all of these streams exceed the applicable state water quality standard of 53.6°F for bull trout spawning and rearing (**Appendix 5A**). A map showing the location of these stream temperature sites is found at the beginning of **Appendix 5A**.

Existing stream temperature conditions are the result of historic land uses. Factors contributing to elevated stream temperatures include 1) channel incision, widening and straightening as a result of past land use activities, 2) the loss of riparian vegetation resulting from historic placer mining, beaver trapping, timber harvest, and grazing, and 3) the loss of groundwater inputs due to loss of floodplain access and groundwater recharge during flooding.

Prior to 2010, four streams in the analysis area (Beaver, Bull Run, Clear and Granite) were 303(d) listed by Oregon Department of Environmental Quality (ODEQ) as water quality limited for temperature and in two cases, sedimentation. With the completion of the John Day River Basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP) (ODEQ 2010), these four streams are no longer 303(d) listed for temperature. The temperature target as determined by the John Day River Basin TMDL and WQMP for streams in this watershed is 53.6°F (p. 61). All eleven streams continue to exceed this standard (**Appendix 5A**).

Sedimentation

Bull Run and Granite Creeks are listed as water quality impaired for sedimentation under Section 303(d) of the Clean Water Act by the State of Oregon. This listing did not change as a result of the John Day TMDL and WQMP.

Turbidity

Turbidity measurements were taken in July and August 2014 of streams in the Granite watershed. Values were low except where culverts and/or channel realignment was occurring (**Appendices 5A and 5B**). However, repeat measurements on Deep Creek and on Bull Run Creek where activity had recently occurred found that turbidity values dropped quickly (within hours) after activity was completed and had returned to background levels when remeasured six days later.

Heavy metals

Past Mining Activity

Portions of the watershed were severely altered by lode and placer mining activities from the late 1800s up to 1950s. Mining effects on watershed function are variable, highly complex, and fully described elsewhere in numerous reports and scholarly articles. Since the 1970s restoration efforts were made to reclaim abandoned mines with known toxic discharge focused on diverting discharge into off-channel settling ponds and old dredge tailings.

Refer to Chapter 1 and the Fisheries section of this chapter for more information about historic placer and lode mining activity in the Granite Creek watershed.

Proposed Mining Activity

Four Plans in the analysis area have adits proposed for activity: Eddy Shipman, L&H, Royal White, and Tetra Group. Of the four, L&H and Royal White operations have least one adit currently that discharges water (**Table 3-6**). None of the adits discharging water have been tested for water quality.

Table 3-6: Plans that propose to Lode mine and current hydrology of the Adits

Operation	Number of Portals	Adit name on project map	Site Hydrology	Proximity to a Creek
Eddy Shipman Lode/ Placer (East portal)	1	A	Adit A: Dry	About 150 feet from Granite Creek and elevationally above the creek

Operation	Number of Portals	Adit name on project map	Site Hydrology	Proximity to a Creek
Eddy Shipman Lode/ Placer (West portals)	1	B	Adit B: Dry	About 150 feet from Granite Creek and 250 feet from Chipman Gulch and elevationally above both
L and H Placer/Lode	3	Adit 1: North side Adit 2: North side Adit 3: South side	Adit 1: dry. Adit 2: dry. Adit 3: Water discharging out of adit	Adit 1: Above the access road Adit 2: Above the access road Adit 3: Less than 50 feet from Olive Creek
Royal White Group Lode	4	Blackhawk Lower Blackhawk Upper Royal White upper Royal White Lower	Blackhawk Lower adit: Currently has water in adit. Water will be used for mining. Blackhawk Upper adit. Dry. Adit is collapsed. Royal White Upper adit: Dry. Primary adit to be mined. Royal White Lower adit: Water seasonally discharges from this adit. This water will be used for mining.	All adits more than 300 feet from any creek or channel as they are on a ridge.
Tetra Alpha Mill and Lode	1	Upper adit	Adit portal is collapsed. Dry	Adit is more than 200 feet from Boulder Creek and elevationally above the creek

Flow Characteristics

No active or discontinued stream gages occur within the Granite Creek watershed though there is a stream gage within the North Fork John Day Subbasin (17070202). However, the NFJD gage (OWRD 14046000) is located at Monument, Oregon below the confluence of the NFJD with the Middle Fork John Day. The stream gage captures water from drainage area of 2520 sq. miles. However, based on the limited precipitation and snowfall records and stream gage data from other watersheds in the area (i.e. North Fork Burnt River USGS gage 13269300), the runoff-streamflow regime is dominated by spring snowmelt with peaks occurring in May and June and water levels dropping in the summer.

The Pete Mann Ditch diverts water from the Granite Watershed to the Burnt River Watershed. Two subwatersheds are affected by this ditch: Clear Creek and Beaver Creek. The downstream flows to Clear Creek and ultimately to Granite Creek are affected.

While no historic data exists about the stream flow magnitudes, timing, and durations for streams in this area, flows would have changed in response to changes in channel morphology, erosion of upland soils as a result of past land uses and therefore their water holding capacities, and the development of a road network which routes surface water and near surface groundwater more quickly to the streams. Current spring snowmelt peaks therefore likely have higher magnitudes and shorter durations than historically.

Summer base flows are lower as a result of a decrease in groundwater contributions due to channel incision and road interception of groundwater that previously contributed to summer baseflow.

Stream Surveys

Streams in the Granite Watershed have had stream habitat surveys done since 1990. Some of the larger streams were resurveyed in 2007, 2009, and 2012 (**Table 3-7**). The surveys provide a snapshot of stream conditions and parameters measured include pools and riffles, width/depth ratios, bankfull widths, large and small wood. The methodology for measuring select stream features varied throughout the years as protocol changed. Some stream survey measurements vary as a function of discharge and definitions have changes over the years about what size wood to include in the count. Therefore, data collected one year cannot be compared against future years without first carefully examining measurement protocols and reach boundaries. Stream survey results are presented in the *Fisheries section* in Chapter 3.

Table 3-7: Stream surveys in the Analysis Area

Forest	SWS name	Stream Name	Most recent survey year
Wallowa-Whitman National Forest			
	Beaver	Beaver Creek	2007
		Olive Creek	1990
		Olive Creek	2007
		S FK Beaver	1992
		S FK Beaver	2007
		S FK Beaver -3rd tributary	1992
	Bull Run	Beagle	1993
		Bull Run	1991
		Channel	1993
		Corral	1993
		Gutridge	1993
		Onion Gulch	1993
		Pasture	1993
	Upper Granite	Granite Creek	1990
		Granite Creek	1991
		Granite Creek	2009
		S FK Boulder	1993
Umatilla National Forest			
	Lower Granite	Rabbit Creek	1999
	Lower Granite	Squaw Creek	2012
		Ten Cent Creek	2012
	Clear Creek	Spring Creek	1997

Forest	SWS name	Stream Name	Most recent survey year
		Lightning Creek	1997
		Clear Creek	1997
		Dry Creek	1997
		E FK Clear Creek	1997
		Granite Creek	2005
		N FK Ruby Creek	1998
		Salmon Creek	1997
		W Fork Clear Creek	1997
		S Fork Ruby Creek	1998

Existing Beaver Dams

Beaver dams were noted in 1991 stream survey on Bull Run Creek. No current beaver activity or beaver dams were observed in the streams along any of the proposed mining operations by the hydrologist during the 2004, 2010, 2011, and 2012 field seasons. Some beaver activity has, however, been recently observed by the Forest Service in the Granite Creek watershed.

Wetlands and Floodplains

Executive Order 11990: Protection of Wetlands was signed in 1997 in order to “minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.” Wetlands are “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils. Wetlands generally include swamps, marshes, bogs, and similar areas.”

Executive Order 11988 (Protection of Floodplains) requires government agencies to take actions that reduce the risk of loss due to floods, to minimize the impact of floods on human health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Executive Order 11988 defines the term “floodplain” as follows: “...that area subject to a one percent or greater change of flooding in any given year.” This equates to the 100 year flood.

Wetlands and floodplains occur throughout the Granite Watershed, including within the project boundaries of mining operations. The wetlands are mainly springs or seeps associated with draws or slumps, or associated with old dredge sites. Active floodplains (1 to 2 year event) occur along the streams within the project area and there are several areas where there are areas flooded less frequently but every 5 to 10 years based on the vegetation present.

Water/Roads Interaction

Roads within the analysis area provide the benefit of access for management activities and public use, but also have adverse impacts to the function of the watershed. Roads can alter physical processes in stream, leading to changes in flow regimes, the movement and storage of sediment, bank stability and substrate composition. Roads also intercept near-surface groundwater converting it to surface water which can then be more rapidly routed to the stream and removed from the watershed or evaporates. These changes can have important biological consequences, affecting all stream ecosystem components (Furniss et al., 1991). Sediment that erodes from roads enters the streams at road-stream crossing sites. Road maintenance and construction of drainage features on the roads often limits the length of road that can contribute sediment to a road-stream crossing point to about 100 feet per side. As road maintenance decreases so does the effectiveness of the drainage features and the length of road that can contribute sediment increases. However, the amount of sediment potentially contributed at a stream crossing is small compared to road failures which can rapidly input large volumes of sediment into a creek. There are 440.95 miles of roads of all jurisdictions (Forest Service open and closed, private, County and State) within the five subwatersheds in the Analysis Area. Ninety-six percent (424.8 miles) of the total road miles are Forest Service road miles (**Table 3-8**).

FS NOTE: The *Total SWS acres* presented below are less than the acres listed in **Table 3-2** because the Lake Creek subwatershed was removed from further discussion due to the lack of Plans in that subwatershed.. Road miles in Lake Creek subwatershed are also not included in **Table 3-8**.

Table 3-8: Total road miles by TOTAL SWS and by SWS on NFS lands within the Analysis Area. Roads include Forest Service open and closed roads, private roads, and County and State roads. (Forest Service GIS data 2013)

SWS Name	TOTAL SWS (acres)	TOTAL SWS (sq. miles)	TOTAL Existing Road Miles	TOTAL Existing Road Density (miles/sq. mile)	Forest Service SWS (acres)	Forest Service SWS (sq. miles)	Forest Service Road miles	Forest Service Road Density (miles/sq. mile)
Beaver Creek	13077.22	20.43	125.68	6.15	12119.39	18.9	121.6	6.4
Bull Run Creek	19399.47	30.31	146.25	4.82	18764.96	29.3	140.9	4.8
Clear Creek	20467.89	31.98	38.69	1.21	19410.69	30.3	35.6	1.2
Lower Granite Creek	20283.21	31.69	59.39	1.87	19009.71	29.7	56.2	1.9

SWS Name	TOTAL SWS (acres)	TOTAL SWS (sq. miles)	TOTAL Existing Road Miles	TOTAL Existing Road Density (miles/sq. mile)	Forest Service SWS (acres)	Forest Service SWS (sq. miles)	Forest Service Road miles	Forest Service Road Density (miles/sq. mile)
Upper Granite Creek	9313.59	14.55	70.94	4.87	9141.07	14.3	70.5	4.9

Soils

According to the 2012 Forest Service Terrestrial Ecological Unit Inventory (TEUI) data base, the Granite Creek Watershed has about 221 soil map units. The most common soils types (almost 50% of the watershed) are derived from the metavolcanic and metasedimentary bedrocks. Basalt and/or andesites, andesitic tuffs, and Alluvial-derived soils each make up about 17% of the watershed. Granite rocks are the parent materials of about 11% of the soils in the Granite Creek Watershed. Glacial till is about 4% of the watershed (*USDA Forest Service 1997*).

Metavolcanics and Metasediments

Partially metamorphosed sedimentary rocks like argillite make up almost 40% of the watershed, compared to about 11% for metavolcanic rocks. This rock-weathering group occurs in all subwatersheds of the area. Argillites are the most common metasedimentary rock and have a tendency to weather to coarse-textured soils with low water-holding capacity. Because they are highly fractured, metasediments allow greater penetration of water than most volcanic rocks in the area. Water is more available to trees and shrubs growing on the highly fractured metasediment- and metavolcanic- derived soils than for soils derived from other less fractured rock types (*USDA Forest Service 1997*).

Soft Clay-Producing Tuffs

The soft andesitic tuffs of the Clarno, and in some cases the John Day formation, weather rapidly to clay textures. They make up about 15 percent of the watershed and are generally at lower elevations and on gentle slopes. These have the most distinctive slope stability properties of all the rock-weathering groups. Sites with steep slopes and abundant water are prone to mass failure. Rotational slumps and flows occur in these materials in several parts of the watershed and create significant problems to road construction and maintenance. They tend to have a lower potential for gully erosion than soils derived from granitic rocks or argillites because the clays make them more cohesive (*USDA Forest Service 1997*).

Hard Intermediate and Basic volcanic Rocks

Soils derived from basalt and andesite are generally the most stable of the volcanic group. Their fertility is intermediate between the coarse granitics with low nutrient levels and the soft tuffs with the highest water-holding capacity. They make up about 17% of the watershed (*USDA Forest Service 1997*).

Existing Detrimental Soil Conditions (DSC)

Historically, the Granite Creek watershed has been extensively logged, mined, grazed and roaded. Therefore, existing detrimental soil conditions (DSC) are expected to be high in some areas. However, actual existing DSC values for each subwatershed were not determined because no measureable change in existing condition is expected to occur as a result of the proposed activities based on the following Plan characteristics:

1. The Analysis Area for each Plan is 10 acres or less (**Table 3-9**).
2. Many of the Plans propose to rework a mix of previously mined and new sediments
3. The areas proposed for activity are scattered throughout five subwatersheds
4. There is a large size difference between the size of the subwatershed (9,313 to 20467 acres) and the size of the areas proposed for mining activity. The result is that the total area proposed for activity within any one subwatershed is 0.31 % or less.

Table 3-9: Analysis area for each Plan by Subwatershed

SWS Name/Acres	Plan of Operation	Analysis Area for Each Plan (Acres)	Percent of SWS
Beaver Creek SWS (13,077.22 acres)			
	Altona	5	0.038
	Belvadeear Group	3	0.023
	Bunch Bucket	10	0.076
	L&H	8	0.061
	Olive Tone	2	0.015
	Royal White	3	0.023
	Sunshine McWillis	2.5	0.019
	Yellow Jacket	7.5	0.057
SWS TOTAL		41	0.312
Bull Run Creek SWS (19,399.47 acres)			
	Blue Sky Bull Run	1.7	0.009
SWS TOTAL		1.7	0.009

SWS Name/Acres	Plan of Operation	Analysis Area for Each Plan (Acres)	Percent of SWS
Clear Creek SWS (20,467 acres)			
	Grubstake	2	0.010
	Lightning Creek	5	0.024
	Lucky Strike	2	0.010
	Ruby	2.5	0.012
SWS TOTAL		11.5	0.056
Lower Granite Creek SWS (20,283 acres)			
	Blue Smoke	1.75	0.009
	East 10 Cent	2	0.010
	Hopeful 1	1	0.005
	Hopeful 2&3	3.5	0.017
	Little Cross	1	0.005
	Rosebud	5	0.025
	Troy D	8	0.039
	City Limits	1	0.005
SWS TOTAL		23.25	0.115
Upper Granite Creek (9,313 acres)			
	Eddy Shipman	2.5	0.027
	Make it	2	0.021
	Muffin	2.5	0.027
	Old Eric	1	0.011
	Tetra Alpha Placer	8	0.086
	Tetra Alpha Mill and Lode	2	0.021
	Yellow Gold	9	0.097
SWS TOTAL		27	0.290

SWS Name/Acres	Plan of Operation	Analysis Area for Each Plan (Acres)	Percent of SWS
PROJECT AREA TOTAL		104.45	0.126

Environmental Effects

This section describes the direct, indirect and cumulative effect on the Water and Soil Resources in the Granite Creek Mining Analysis Area.

Water Resources – Effects Analysis

Alternative 1 – No Action Alternative

Direct and Indirect Effects

Under Alternative 1 of the Granite Mining Project, the Forest Service would not change management in the project area but would require that past NEPA decisions related to these Plans be implemented. While there would be no proposed mining under this alternative, there are connected reclamation activities.

Potential effects to water resources from these reclamation activities are shown in **Table 3-10**. Direct/indirect effects would be limited to two subwatersheds: Clear Creek and Upper Granite. Grubsteak, Lightning, and Ruby Group occur within the Clear Creek subwatershed and have the potential for a discharge of sediment and/or creosote into the adjacent creek. Tetra Alpha Placer occurs within the Upper Granite subwatershed and has the potential to discharge sediment into Boulder Creek, a tributary of Granite Creek.

Table 3-10: Effects to Water Resources under Alternative 1 by Subwatershed

SWS Name	Plan	Creek	Alternative 1	Water Resources Effects	Pollutant
Beaver Creek SWS					
	Altona	Quartz Gulch	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Belvadeear Group	Olive Creek	Equipment would be removed	NO EFFECT to water resources related to equipment removal because the creek would not be crossed during removal.	None
	L&H	Olive	Shed would be	NO EFFECT to water resources	None

SWS Name	Plan	Creek	Alternative 1	Water Resources Effects	Pollutant
		Creek	removed	related to shed removal because the creek would not be crossed during removal.	
	Olive Tone	Olive Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Royal White Group	Irish Gulch	Cabins would be removed. Adits would be gated.	NO EFFECTS to water resources because no creeks in the area.	None
	Sunshine/McWillis	McWillis Gulch	Cabins and road 1305-M1a would be removed	NO EFFECT to water resources related to cabin or the road removal because removing cabin would be via roads that do not cross McWillis Gulch, and TA 1305-M1a is separated from the Gulch by 50 feet or more of vegetated ground.	None
	Yellow Jacket	Orofino Gulch	Spring development and sheds would be removed. Site would remain as is.	NO EFFECT to water resources because shed removal does not require crossing a creek and removal of spring development would not alter spring area.	None
Bull Run Creek SWS					
	Blue Sky/Bull Run	Bull Run Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
Clear Creek SWS					
	Bunch Bucket	Clear Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Grubsteak	Clear Creek	Bridge, equipment, & shed removed, the large hole would be filled in.	POTENTIAL EFFECT to water resource effect related to bridge removal due to possible input of creosote logs into the creek and input of sediment related to use of the ford during bridge and shed removal. NO EFFECT to water resources related to filling in the large hole because hole is more than 200 feet from the creek.	Sediment and creosote
	Lightning Creek	Lightning Creek	Bridge removed, Cabins maintained as historical structure.	POTENTIAL EFFECT to water resource effect related to the input of creosote bridge logs into the creek and input of sediment related to use of the ford during bridge removal.	creosote

SWS Name	Plan	Creek	Alternative 1	Water Resources Effects	Pollutant
	Lucky Strike	Lightning Creek	Cabins maintained as historical structure	NO EFFECTS because no activity proposed.	None
	Ruby Group	Ruby & Clear Creek	Cabin would be removed	POTENTIAL EFFECT to water resources due to sediment inputs by equipment when removing the cabin from use of the Clear Creek and Ruby Creek fords and the TA road 1310-E1a	Sediment
Lower Granite SWS					
	Blue Smoke	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	East Ten Cent Creek	East Ten Cent Creek	Cabin and road 7350-M1a would be removed	NO EFFECT to water resources related cabin and road removal because removal would not require crossing the creek and there is a vegetative berm between the road and the creek that would effectively trap any sediment.	None
	Hopeful 1	Granite Creek	Cabin would be removed	NO EFFECT to water resources from cabin removal because removal would not require crossing the creek.	None
	Hopeful 2&3	Granite Creek	Cabins and road 1035-E1b would be removed.	NO EFFECT to water resources related to cabin or road removal because both cabin and road are on the north side of the creek and removals do not require crossing Granite Creek. TA 1035-E1b is separated from the creek by at least 50 feet of vegetated ground.	None
	Little Cross 1	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Rose Bud 1-4	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Troy D	Granite Creek	Equipment and gates would be removed	NO EFFECT to water resources related to equipment removal because removals do not require crossing Granite Creek.	None
Upper Granite SWS					
	City limits	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None

SWS Name	Plan	Creek	Alternative 1	Water Resources Effects	Pollutant
	Eddy-Shipman	Granite Creek	Cabins would need to be removed. The adits would remain caved in.	NO EFFECT to water resources related cabin removal because removal would not require crossing the creek.	None
	Make It	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Muffin	Last Chance Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Old Eric 1&2	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Tetra Alpha Placer	Boulder Creek	Equipment and roads 7355-M3a, and 7355-M3b would be removed.	POTENTIAL effects to water resources due to inputs of sediment during use of the existing ford because these two roads are located on the south side of Boulder Creek. Removal of these roads would require that heavy equipment cross the creek, potentially multiple times, to do the reclamation.	Sediment
	Tetra Alpha Mill & Lode	Last Chance & Boulder Creek	Equipment and roads 7355-M4a and 7355-M4b would be removed.	NO EFFECT to water resources related to road removals because the roads are on the north side of Boulder Creek and reclamation work would not require crossing the creek.	None
	Yellow Gold	Last Chance Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None

Alternatives 2 and 3

Introduction

In this section, the effects of Alternative 2 and Alternative 3 are combined to help the reader track the changes between the two alternatives. Alternative 2 is the Plan of Operation (Plan) as proposed by the miners. Alternative 3 is the Plan with additional Forest Service Water Resource Protection Measures (WRPMs) and General Requirement (GRs) designed to decrease or eliminated water resource impacts.

The Forest Service Water Resource Protection Measures (WRPMs) and selected Fish Protection Measures related to water quality are found in Appendix 1A and the General Requirements (GRs) are found in Appendix 2.

Under Alternatives 2 and 3, there are 28 Plans. The Plans are distributed over five subwatersheds and two National Forests. The analysis area is areas proposed for mining activity in each Plan. The analysis areas are 10 acres or less (**Table 3-11**).

Many of the Plans have multiple sites proposed for activity. Each site was individually analyzed for effects to Water Resource and for compliance with the WWNF and Umatilla NF Forest Plans, and State and Federal laws and policies. The detailed effects analysis for each Plan is found in **Appendix 7**. This Chapter summarizes the direct, indirect and cumulative effects of the 28 proposed Plans.

Table 3-11: Analysis area for Each Plan by Subwatershed (SWS)

SWS Name/ Acres	Plan	Analysis Area for Each Plan (Acres)	Plan type	National Forest
Beaver Creek SWS (13,077.2 acres)				
	Altona	5	Placer	WWNF
	Belvadeear Group	3	Placer	WWNF
	L and H	8	Placer and Lode	WWNF
	Olive Tone	2	Placer	WWNF
	Royal White	3	Lode	WWNF
	Sunshine McWillis	2.5	Placer	WWNF
	Yellow Jacket	7.5	Placer	WWNF
SWS TOTAL		41		
Bull Run Creek SWS (19,399.5 acres)				
	Blue Sky Bull Run	1.7	Placer	WWNF
SWS TOTAL		1.7		
Clear Creek SWS (20,467 acres)				
	Bunch Bucket	10	Placer	UNF
	Grubstake	2	Placer	UNF
	Lightning Creek	5	Placer	UNF
	Lucky Strike	2	Placer and Lode	UNF and WWNF
	Ruby	2.5	Placer	UNF
SWS TOTAL		11.5		
Lower Granite Creek SWS (20,283 acres)				
	Blue Smoke	1.75	Placer	UNFMA
	City Limits	1	Placer	WWNF
	East 10 Cent	2	Placer	UNF
	Hopeful 1	1	Placer	UNF
	Hopeful 2&3	3.5	Placer	UNF
	Little Cross	1	Placer	WWNF

SWS Name/ Acres	Plan	Analysis Area for Each Plan (Acres)	Plan type	National Forest
	Rosebud	5	Placer	UNF
	Troy D	8	Placer	WWNF
SWS TOTAL		23.25		
Upper Granite Creek (9,313 acres)				
	Eddy Shipman	2.5	Placer and Lode	UNF and WWNF
	Make it	2	Placer	WWNF
	Muffin	2.5	Placer	WWNF
	Old Eric	1	Placer	UNF
	Tetra Alpha Placer	8	Placer	WWNF
	Tetra Alpha Mill & Lode	2	Lode	WWNF
	Yellow Gold	9	Placer	WWNF
SWS TOTAL		27		
PROJECT TOTAL		104.45		

Direct and Indirect Effects

Water Quality: Clean Water Act, Section 401 (potential for a discharge)

Under Alternatives 2 and 3, the 28 Plans of Operation were evaluated for the potential for a discharge of a pollutant, as defined by the Clean Water Act, and thus a change in water quality. Aspects of the Plans evaluated for discharge potential were 1) mining activity, 2) fords and bridges, 3) roads, and 4) ponds. Pollutants evaluated were sediment, heavy metals and warm water.

Under Alternative 2, 18 Plans have one or more activities with the potential for a discharge (**Table 3-12**). As a result, portions of these 18 Plans would not be in compliance with Section 401 of the CWA.

Under Alternative 3, the number of Plans with the potential for a discharge decreases from 18 to two as a result of the addition of Forest Service WRPMs (Appendix 1A) and General Requirements (Appendix 2). In the two remaining Plans with a discharge potential, both have a reduction in the number of aspects in the Plan with the potential for a discharge. This is the result of the addition of Forest Service WRPMs and General Requirements that would eliminate some of the discharge potential.

Table 3-12: Plans with the Potential for a Discharge under Alternative 2 and 3 by Subwatershed (SWS)

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	Alternative 3	Alt 2	Alt 3
Beaver Ck SWS						
Altona (Placer)	WWNF	Quartz Gulch	<ol style="list-style-type: none"> 1. Potential discharge of sediment via surface flow related to mining activity. 2. Potential discharge of heavy metals via surface and subsurface flow related to use of adit water could NOT be evaluated due to lack of information regarding location. 3. Potential discharge related to pond location <u>could not be evaluated</u> because location is tied to adit discharge and adit location is unknown. 	<ol style="list-style-type: none"> 1. No discharge potential because of addition of FS WRPMs and GRs. 2. No discharge potential if adit location is found and used because of addition of FS WRPMs and GRs. 3. Same as Alternative 2. Potential could not be evaluated for ponds. 	Sediment	None
Belvadear (Placer)	WWNF	Olive	Potential discharge of sediment via subsurface flow related to mining activity.	Same as Alternative 2. Discharge potential exists.	Sediment	Sediment
L and H (Placer and Lode)	WWNF	Olive	<p>Potential discharge of sediment via surface flow related to</p> <ol style="list-style-type: none"> 1. Reclamation activity in adit 3. <p>Potential discharge of heavy metal via surface flow related to:</p> <ol style="list-style-type: none"> 2. Mining and reclamation activity in adit 3 3. Use of water that is discharging from adit 3 	<ol style="list-style-type: none"> 1. None because discharge potential of sediment eliminated related to reclamation at adit 3 as a result of the addition of FS WRPMs and GRs. 2. None because discharge potential of heavy metals eliminated related to mining and reclamation at adit 3 as a result of the addition of FS WRPMs and GRs. 	Sediment and Heavy metals	None

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	Alternative 3	Alt 2	Alt 3
				3. None because discharge potential of heavy metals eliminated related to use of adit water as a result of the addition of FS WRPMs and GRs.		
Olive Tone (Placer)	WWNF	Olive	Potential discharge of sediment from ponds and stream banks via subsurface flow as a result of use of the proposed settling ponds.	None because discharge potential eliminated as a result of the addition of FS WRPMs.	Sediment	None
Royal White (Lode)	WWNF	n/a. On a ridge	None	None	None	None
Sunshine McWillis (Placer)	WWNF	McWillis Gulch	Potential discharge of sediment via surface flow related to: 1. Mining at site 2 2. Activity at Processing Site 2	None because discharge potential eliminated for all activities identified under Alternative 2 as a result of the addition of FS WRPMs and GRs.	Sediment	None
Yellow Jacket (Placer)	WWNF	Orofino Gulch	None	None	None	None
Bull Run Creek SWS						
Blue Sky Bull Run (Placer)	WWNF	Bull Run	Potential discharge of sediment via surface flow related to: 1. Mining at Blue Sky site 2, Blue Sky site 3, Blue Sky site 4, Bull Run site 1 2. Use of ford across Swamp Creek 3. Proposed placement and removal of a temporary bridge at Bull Run site 2	1. Discharge potential related to mining activity remains BUT decreases and is restricted under Alternative 3 to Blue Sky site #3. No discharge potential at the other sites due to the addition of FS WRPMs and GRs. 2. Discharge potential eliminated as a result of the addition of FS	Sediment	Sediment

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	Alternative 3	Alt 2	Alt 3
			4. Construction of proposed TA roads 7300-M4a and M4b.	<p>WRPMs.</p> <p>3. Discharge potential eliminated because the bridge dropped and replaced by a temporary two-track road (7300-M1b). The road has no discharge potential as a result of the additional of FS WRPMs and GRs.</p> <p>4. Discharge potential eliminated as a result of the addition of FS WRPMs and GRs.</p>		
Clear Creek SWS						
Bunch Bucket (Placer)	UMA	Clear	Potential discharge of sediment via surface flow related to activity in the small channel.	None because discharge potential eliminated as a result of the addition of FS WRPMs and GR	Sediment	None
Grubsteak (Placer)	UMA	Clear	<p>Potential discharge of sediment related to:</p> <p>1. Mining at site B</p> <p>2. Use of ford across Clear Creek.</p> <p>3. Potential discharge related to proposed settling ponds could not be evaluated under Alternative 2 because locations not specified by the miner.</p>	<p>1. None because discharge potential related to mining at Site B eliminated as a result of the addition of FS WRPMs</p> <p>2. None because discharge potential related to ford use eliminated as a result of the addition of FS WRPMs</p> <p>3. None because discharge potential related to ford use eliminated as a result of the addition of FS WRPMs</p>	Sediment	None

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	Alternative 3	Alt 2	Alt 3
Lightning (Placer)	UMA	Lightning	None	None	None	None
Lucky Strike (Placer and Lode)	UMA and WWNF	n/a. One a ridge	None	None	None	None
Ruby Group (Placer)	UMA	Ruby Creek and Clear Creek	Potential discharge of sediment via surface flow related to: <ol style="list-style-type: none"> 1. Mining activity at Sites 1, 2, 3, 4,5,6,8 2. Use of the existing Ruby Creek ford 3. Use of the existing Clear Creek ford 4. Use of existing TA road 1310-E1a. 5. Seasonal installation and removal of proposed ATV bridge 	None because discharge potential eliminated for all activities identified under Alternative 2 as a result of the addition of FS WRPMs and GRs.	Sediment	None
Lower Granite SWS						
Blue Smoke (Placer)	UMA	Granite	None	None	None	None
East 10 Cent (Placer)	WWNF	East 10 Cent	Potential discharge of sediment via surface flow related to mining activity.	None because discharge potential eliminated as a result of the addition of FS WRPMs and GRs.	Sediment	None
Hopeful 1 (Placer)	UMA	Granite	None	None	None	None
Hopeful 2&3 (Placer)	UMA	Granite	Potential discharge of sediment via surface flow related to: <ol style="list-style-type: none"> 1. Use of east ford across Granite Creek NOT evaluated under Alternative 2 based on miner's protection measure which stated would work with FS in minimizing impacts. 	None because discharge potential eliminated for all activities as a result of the addition of FS WRPMs and GRs.	Sediment	None

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	Alternative 3	Alt 2	Alt 3
			2. Construction and use of the North processing ponds 3. Use of TA road 1035-E1d used to access the south side processing site. 4. Crossing of the unnamed tributary on the south side to access the south processing site via TA road 1035-E1d.			
Little Cross (Placer)	WWNF	Granite	Potential discharge of sediment via surface and subsurface flow related to: 1. Mining activity 2. Construction and use of pond (pond and test hole are the same).	None because discharge potentials for mining activity and pond uses and construction eliminated as a result of the addition of FS WRPMs and GRs.	Sediment	None
Rosebud 1-4 (Placer)	UMA	Granite	None	None	None	None
Troy D (Placer)	WWNF	Granite	Potential discharge of sediment via subsurface flow related to use of the settling ponds.	None because discharge potential eliminated as a result of the addition of FS WRPMs.	Sediment	None
Upper Granite SWS						
City Limits	WWNF	Granite	None	None	None	None
Eddy Shipman (Placer and Lode)	UMA and WWNF	Granite	Potential discharge of sediment via surface flow related to: 1. Lode mining and construction 2. Use of proposed source water pond and settling ponds for processing 3. Use of existing ford that crosses	1. None because discharge potential eliminated as a result of the addition of FS GR L5. 2. None because discharge potential eliminated as a result of the addition of FS WRPMs.	Sediment and heavy metals	None

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	Alternative 3	Alt 2	Alt 3
			Granite Creek via FS road 7300-680 4. Use of FS closed road 7300-680 5. Use of existing TA road 7300-E1d.	3. None because discharge potential eliminated as a result of the addition of FS WRPMs and GRs. 4. None because discharge potential eliminated as a result of the addition of FS WRPMs 5. None discharge potential eliminated as a result of the addition of FS WRPMs and GRs.		
Make It (Placer)	WWNF	Granite	None	None	None	None
Muffin (Placer)	WWNF	Last Chance	None	None	None	None
Old Eric 1 and 2 (Placer)	UMA	Granite	Potential discharge of warm water via subsurface flow related to use of settling pond.	None because discharge potential of warm water eliminated as a result of the addition of FS WRPMs.	Warm water	None
Tetra Alpha Placer	WWNF	Boulder	Potential discharge of sediment via surface flow related to: 1. Mining at Stage 1 area 2. Mining at Stage 2 area 3. Use of existing downstream (west) ford across Boulder Creek 4. Construction and use of proposed middle ford across Boulder Creek 5. Construction and use of proposed upstream (east) ford across Boulder	None because discharge potential eliminated for all activities identified under Alternative 2 as a result of the addition of FS WRPMs and GRs. Middle ford dropped under Alternative 3.	Sediment	None

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	Alternative 3	Alt 2	Alt 3
			Creek, 6. Construction and use of a portion of the proposed TA road 7355-M3d which crosses a meadow.			
Tetra Alpha Mill and Lode	WWNF	Boulder	<u>Lode portion:</u> None <u>Mill portion:</u> Potential discharge of heavy metals from lode material via subsurface flow related to: 1. Use of the existing settling ponds adjacent to Boulder Creek.	<u>Lode portion:</u> None <u>Mill portion:</u> None because discharge potential eliminated for heavy metals as a result of the addition of FS GRs.	Heavy metals	None
Yellow Gold (Placer)	WWNF	Last Chance	Potential discharge of sediment related to mining at the East site. NOTE: Potential discharge related to the proposed settling ponds <u>could not be determined</u> because locations not provided in the Plan.	None because discharge potential eliminated related to mining and construction and use of the proposed ponds as a result of the addition of FS WRPMs.	Sediment	None

This page intentionally left blank.

Roads Proposed for Used by Miners (Existing or Proposed)

Miners propose to use a mix of existing Forest Service (FS) closed and decommissioned roads and existing temporary mine access roads (non-system roads), as well as create some new mine-access roads. The roads are distributed over five subwatersheds (SWS) (**Table 3-13**). The roads proposed for use for each Plan, and their surface type (native, gravel, aggregate, tailings) are found in **Appendix 6**. The effects analyses for each road were based on road distance from the creek, topography, and ground cover, and are discussed in **Appendices 3 and 7**.

Under Alternative 2, a total of 13.99 miles of road are proposed for use by the miners, with all but 0.3 miles using existing templates. All roads would be native surface roads.

Under Alternative 3, the miles of road proposed for use decreases from 13.99 miles to 12.82 miles, with all but 0.3 miles using existing templates. Under Alternative 3, a reduction in miles (1.3 miles) occurs in the Beaver Creek SWS, while in the Bull Run SWS 0.2 miles of miner access road would be added (7375-M1b), which incorporates the 0.07 miles for TA road 7300-M4b into TA road 7375-M1b. The 0.2 miles of new TA road (7375-M1b) would occur in the Blue Sky Bull Run Plan to allow access to Bull Run site 2 instead of the combination of the proposed bridge and the proposed 7300-M4b.

Table 3-13: Distribution of miles of FS closed/decommissioned, Existing, or Proposed Temporary Access Road by Subwatershed under Alternatives 2 and 3 by Subwatershed (SWS)

	Forest Service				Temporary Access Road				TOTAL	
	Closed		Decommissioned		Existing		Proposed			
SWS Name	Alt 2	Alt 3	Alt 2	Alt 3	Alt 2	Alt 3	Alt 2	Alt 3	Alt 2	Alt 3
Beaver	0.93	0.4	0.45	0.45	2.64	1.87	0.05	0.05	4.07	2.77
Bull Run	0	0	0	0	0.33	0.33	0.14	0.27	0.47	0.6
Clear	0	0	0	0	1.5	1.5	0	0	1.5	1.5
Lower Granite	0.84	0.84	0	0	2.47	2.47	0	0	3.31	3.31
Upper Granite	2.49	2.49	0	0	2.04	2.04	0.11	0.11	4.64	4.64
TOTAL	4.26	3.73	0.45	0.45	8.98	8.21	0.3	0.43	13.99	12.82

Under Alternative 2, 1.2 miles of 13.99 miles was identified as having the potential for a discharge of sediment into a channel. The discharge potential for the two proposed Blue Sky Bull Run roads (0.14 miles) could not be determined because the road locations were not clearly identified in the Plan (**Table 3-14**).

Under Alternative 3, road miles with the potential for a discharge decrease from 1.2 miles to zero (**Table 3-14**) because of the addition of Forest Service WRPMs and GRs. In addition, there would be no discharge potential for the two proposed Blue Sky Bull Run Plan roads (0.14 miles) because of the addition of Forest Service WRPMs and GRs. These WRPMs would require that two proposed roads be located with input from the Forest Service and appropriate protection measures put into place. The Forest Service GRs provide directions for minimizing impacts to the soils and vegetation resources.

This page intentionally left blank.

Table 3-14: Proposed (P) or Existing (E) Roads Proposed for Use with a Potential for a Discharge under Alternative 2 versus Alternative 3 by Subwatershed (SWS)

SWS	Plan	Road Number	Length (miles)	Existing Condition	Site accessed	Discharge Potential	
						Alternative 2	Alternative 3
Bull Run Creek							
	Blue Sky/Bull Run	7300-M4a	0.07	Temporary - P	Blue Sky Site 3	Unknown because location with respect to Bull Run Creek not provided	None because of the addition of FS WRPMs
	Blue Sky/Bull Run	7300-M4b	0.07	Temporary - P	Bull Run Site 2	Alt 2 only. Unknown because location with respect to Bull Run Creek not provided	N/A. Incorporated into 7375-M1b. M1b has no discharge potential (see below)
	Blue Sky/Bull Run	7375-M1b	0.2	Temporary - P	Bull Run Site 2	N/A. Alt. 3 only	None because of the addition of FS WRPMs
Clear Creek							
	Ruby Group	1310-E1a	0.62	Temporary - E	Sites 1, 2, and 3	A portion of this road becomes part of Ruby Creek during high flows.	None because of the addition of FS WRPMs
Lower Granite							
	Hopeful 2, 3	1035-E1d	0.19	Temporary - E	Site 4 & south processing site	A portion of this road is steep and rutted and channeling water and sediment into Granite Creek	None because of the addition of FS WRPMs
Upper Granite							
	Eddy Shipman	7300680	0.1	FS Closed	East side (Adit A)	Road is sloped towards Granite Creek and has fines. Activity will generate sediment which will be transported into the creek during runoff periods.	None because of the addition of FS WRPMs
	Eddy Shipman	7300-E1d	0.07	Temporary - E	East side (Adit A)	Potential for a discharge for same reason as 7300-680	None because of the addition of FS WRPMs
	Tetra Alpha Placer	7355-M3d	0.02	Temporary - P	Stage 2 area	A portion crosses a meadow composed of fine grained sediments and Boulder Creek. Construction of road and ford	None because of the addition of FS WRPMs

SWS	Plan	Road Number	Length (miles)	Existing Condition	Site accessed	Discharge Potential	
						across the meadow expected to generate sediment. The road may rut and erode in the areas close to the creek.	

Water Quality: Clean Water Act, Section 303 (d) (antidegradation)

Stream Temperature

Prior to 2010, four streams were 303(d) listed for elevated stream temperatures (Granite, Beaver, Bull Run, and Clear). With the completion of the John Day Total Maximum Daily Load (2010), these four streams were delisted for elevated stream temperatures. However, the stream temperatures still exceed State standards (53.6°F) on all streams with temperature data, and several Plans have the potential to locally increase temperatures either as a result of an input of warm water from a settling pond or water withdrawals. The potential impact to temperature from the input of warm water is discussed in the section above titled *Water Quality: Clean Water Act, Section 401 (potential for a discharge)*. The potential impacts from water withdrawals are discussed in the section below titled *Other Potential Water Resource Impacts*.

Sedimentation

Granite Creek and Bull Run Creek are 303(d) listed for sedimentation (ODEQ, 2014). Granite Creek is 303(d) listed for sedimentation from river mile 11.2 to 16.2 (ODEQ 2014). Bull Run Creek is 303(d) listed for sedimentation by ODEQ (2014) from river mile 0 to 9.3 or along its entire length. The John Day TMDL (2010) did not address sedimentation and therefore Bull Run and Granite Creeks are still 303(d) listed for sedimentation. However, suction dredging would be allowed under the ODEQ 700 PM permit “*This prohibition does not apply, however, to stream segments that were properly subject to mining under the 700-J permit between May 3, 1999 and July 1, 2005...*” (Schedule C.19). Water quality and channel morphology impacts related to suction dredging are discussed in the *Suction Dredging* section below.

Under Alternative 2, 16 Plans have the potential to discharge sediment into a stream (**Table 3-12**). Of the 16, four Plans would potentially discharge into Granite Creek (Eddy Shipman, Hopeful 2& 3, Little Cross, Troy D) and one Plan would discharge into Bull Run Creek (Blue Sky Bull Run). However, inputs of sediment would not alter existing sedimentation conditions because the sediment would either move through as suspended load or settle out within 300 feet, depending on the size of the sediment that enters (clay, silt vs. sand, gravel or cobbles). The remaining 11 Plans with a potential to discharge sediment would discharge into streams that are not 303(d) listed. Again, the discharge of sediment would not lead to a listing related to sedimentation because the sediment that might enter the streams would also move through as suspended load or settle out within 300 feet, depending on the sediment size.

Under Alternative 3, the number of Plans with the potential to discharge sediment into a stream decreases from 16 to two (**Table 3-12**) as a result of the addition of Forest Service WRPMs and General Requirements. They are the Blue Sky Bull Run Plan (Bull Run Creek) and Belvadear Plan (Olive Creek). The potential for a discharge into Granite Creek has been eliminated as the Forest Service protection measures. The addition of Forest Service protection measures for the Blue Sky Bull Run Plan has reduced the discharge potential to only activities at Blue Sky site 3. As described under Alternative 2, a discharge of sediment would not alter existing sedimentation conditions on Bull Run Creek. The other Plan that still has the potential for a discharge of sediment is Belvadear and it would discharge into Olive Creek, which is not listed.

Other Potential Water Resource Impacts

Several Plans have the potential to impact water quality (temperature or turbidity) in ways not related to the potential for a discharge of a pollutant. With respect to stream temperature, proposed mining activities could increase stream temperature through 1) water withdrawals, 2) reversal of groundwater flows away from the creek, 3) warm water inputs, 4) channel width increase, and 5) shade reduction. The lower the stream flows the higher the potential impact. Whether the impact would be measureable would vary depending on the stream flows at the time of activity. With respect to turbidity, removal of beaver dams would result in a rapid release of sediment of various grain sizes with the potential to increase turbidity and fill in ponds downstream of the dam. The potential impacts are summarized below.

Stream temperature

Water Withdrawals

Water withdrawals reduce stream flows which in turn reduce stream velocity and water depths. The result is that a greater percent of the water column is warmed and stream temperatures increase. In addition, water withdrawals can result in a stream going dry for all or a portion of its length, depending on where the withdrawal occurs relative to other incoming tributaries. If a portion of the stream goes dry downstream, water temperatures could increase as a result of a reduction in flow.

Under Alternatives 2 and 3, eight Plans propose withdrawing water from a creek. They are: Belvadear, Eddy Shipman, Hopeful 1, Lightning, Make It, Olive Tone, Tetra Alpha Placer, and Tetra Alpha Mill and Lode (**Table 3-15**). Details of the analysis for each Plan are found in **Appendix 7** and are summarized below. No information was provided by the miner as to how long they would be withdrawing water. Therefore, the analysis of the effects of withdrawals was based on a continuous withdrawal during daylight hours.

Table 3-15: Plans Proposing to Withdraw Water from a Creek by Subwatershed (SWS)

SWS	Plan	Creek	Amount proposed for withdrawal	Notes
Beaver Creek				
	Belvadear	Olive	100 gpm or 0.2 cfs	
	Olive Tone	Olive	100 gpm or 0.2 cfs	
Clear Creek				
	Lightning	Lightning	100 gpm or 0.2 cfs	
Lower Granite				
	Hopeful 1	Granite	40 gpm or 0.09 cfs	
Upper Granite				
	Eddy Shipman	Chipman Gulch	100 gpm to 150 gpm or 0.2 to 0.3 cfs	
	Make It	Side channel of Granite Ck	100 gpm or 0.2 cfs	Water comes from a pond that is connected to Granite Creek via a side channel
	Tetra Alpha	Boulder (make up water)	100 gpm or 0.2 cfs	Make up water if off channel pond goes dry or doesn't have enough water
	Tetra Group	Boulder (make up	100 gpm or 0.2 cfs	Make up water if pond in

SWS	Plan	Creek	Amount proposed for withdrawal	Notes
		water)		Last Chance Creek isn't enough.

Three of the eight Plans (Hopeful 1, Make It, and Eddy Shipman) would not have measurable impacts to stream temperatures or stream flow under either alternative for the following reasons. Hopeful 1 and Make It, which both withdraw from Granite Creek are 1) more than seven miles apart and 2) the amounts withdrawn (0.09, 0.2 cfs) are much less than summer flows on Granite Creek. Eddy Shipman, proposes to withdraw 0.2 to 0.3 cfs from Chipman Gulch, a tributary of Granite Creek. However, the point of withdrawal would be near its confluence with Granite Creek and therefore the withdrawal would have little impact on Chipman Gulch for most of its length. The impact on flows on Granite Creek would be non-measurable because the Chipman Gulch flows are small compared to Granite Creek. These three Plans would be in compliance with the John Day Basin TMDL because there would be no measureable change in stream temperatures as a result of the withdrawals. Therefore they are not discussed further. Details of the water withdrawal effects are found in Appendix 7 by Plan.

The remaining five Plans (Belvadear, Lightning, Olive Tone, Tetra Alpha Placer, and Tetra Alpha Mill and Lode) have potential impacts to stream temperatures and stream flow related to withdrawing water because they would withdraw from small tributary streams (Boulder, Lightning and Olive Creeks). These three streams have low flows and shallow water depths during the summer. All of these streams exceed the ODEQ State stream temperature of 53.6°F (**Appendix 5**). The limited discharge data available for Lightning Creek and Olive Creek, when combined with stream gage hydrograph data from other areas in close proximity to the analysis area, show, regardless of gage examined, that stream flow drops rapidly in the summer months and flows vary from year to year.

Based on the site conditions, withdrawals under Alternatives 2 and 3 could lead to local increases stream temperatures and sections of the streams going dry, depending on flows that year, in July and August. The amount of impact would vary as a function of the timing of withdrawals, the amount, existing stream flow, and the continuity of the withdrawal (e.g. just to fill a pond vs. continuous withdrawal. However, under Alternative 3, there would be a reduction in the length of time that there would be potential impacts due to the addition of Forest Service Fish Protection Measures related to water quality for Lightning (Lightning Creek), Tetra Alpha Placer (Boulder Creek) and Tetra Alpha Mill and Lode (Boulder Creek) (**Appendix 1A**). These protection measures would limit withdrawals to before August 15 and prevent withdrawals anytime that the stream is dry below the operation. As a result, potential impacts to stream temperatures and stream flow would be reduced to the time period of about July 1 to August 15. While the length of time with potential impacts to stream temperature and flow would be decreased under Alternative 3, the withdrawals would be occurring when stream temperatures tend to be the highest so that the impact to stream temperatures remains (**Appendix 5C**). The Fish Protection Measures were not added to Belvadear and Olive Tone because there are no bull trout or chinook salmon in Olive Creek (T. Hickman, Forest Service Fisheries Biologist, email, 8/15/2014).

Under Alternative 2, these five plans have the potential to locally increase stream temperatures and would not be in compliance with the John Day Basin TMDL. Under Alternative 3, these five would still not be in compliance with the John Day Basin TMDL, though the length of effects would be shorter for Lightning, Tetra Alpha Placer and Tetra Alpha Mill and Lode because of the addition of the Forest Service Fish Protection Measures. Details of the water withdrawal effects are found in Appendix 7 by Plan.

Reversal of Groundwater Flow

Activity that changes the direction of groundwater flow from towards the stream to away from the stream or intercepts groundwater inputs to the stream can result in a reduction in stream flows Dunne and Leopold 1978; Driscoll 1986) . Reductions in stream flow would lead to downstream increases in stream temperature (ODEQ 2010).

Under Alternative 2, the Grubsteak Plan has the potential to alter the direction of groundwater flows at Site B as a result of digging a hole that is less than 50 feet from Clear Creek, 10 to 15 feet deep and 20 to 25 feet in diameter. This depth of hole would place it below the existing stream bed. Because Clear Creek was historically placer mined, the sediments between the test hole and the creek are expected to be dominated by cobbles and coarse gravels and very permeable, based on the large pore sizes. If groundwater flows were to reverse direction (from towards the creek to towards the hole), there is the potential for a section of Clear Creek to go dry, if flows are low. The impact would be an increase in stream temperatures downstream.

Under Alternative 3, the potential to alter the direction of groundwater flows at Site B are eliminated as a result of the addition of Forest Service WRPMs. This WRPM requires that the miner monitor the hole for groundwater. If ground water becomes visible then the miner would limit further deepening until other protection measures were put into place to prevent the stream from going dry and stream temperatures from increasing.

Inputs of Warm Water

Mining activity that results in the addition of warm water into a stream via groundwater would result in a localized increase in stream temperature. As noted earlier, input of warm water into a creek would be a discharge and not meet the intent of Section 401 of the CWA. A summary is provided here in order to capture this impact as it applies to stream temperature.

Under Alternative 2, the Old Eric 1&2 Placer operation has the potential to locally increase stream temperatures as a result of warm pond water entering Granite Creek via groundwater flow. The settling pond is 80 feet long, shallow and unshaded, within 15 feet of Granite Creek and elevationally above the creek. The short distance between the pond and Granite Creek (15 feet) would not give the warm pond water enough time in the ground to cool prior to entering the creek.

Under Alternative 3, the potential for an input of warm water from the Old Eric 1&2 Placer operation would be eliminated as a result of the addition of a Forest Service WRPM that limits the length of time there can be standing water in the settling pond to one day.

Increases in Channel Widths

None of the activities proposed in the Plans of Operation under either alternative would alter stream bank stability because any activities that might destabilize a stream bank would be located at least 25 feet from the stream bank. Therefore, there would be no increases in channel widths related to any proposed activity and no impact on stream temperatures.

Tree Removal and Loss of Shade

While a number of Plans propose to remove select trees during their activity, none of the removals would influence stream temperature under either alternative because the number and size of the trees are small and not casting any shade. Therefore, removal of the trees would not alter stream temperatures.

Beaver Dams

Beaver have been present in the Granite Creek watershed. Stream surveys for 1991 in Bull Run Creek identified beaver dams present. Currently, no dams exist in the areas where mining activity is proposed. However, the distribution and number of beaver dams could increase over time as existing and proposed restoration activities in the Granite watershed improve key riparian woody species needed to build and maintain their dams. Beaver dams provide fish habitat (pools, side channels etc) and increase inchannel complexity (Pollock et al 2004; Demmer and Beschta 2008).

Under Alternative 2, no breaching or removing beaver dams is proposed. If beaver were to create dams, breaching or removing a beaver dam to avoid flooding the operation would not be in compliance with PACFISH MM-2 because dam failure would result in a loss of complexity and quality of fisheries habitat, a reduction in conditions favorable to the expansion of riparian vegetation and increased streamside shade, and a loss of surface and groundwater storage (Apple et al 1984; Demmer and Beschta 2008; Hood and Bayley 2008; Pollock et al 2004). The sediment eroded from behind the dams would result in a short-term increase in turbidity.

Under Alternative 3, if beavers were to build dams in the mining areas, Forest Service General Requirement G-14 states that the beaver dams would not be breached. However, this requirement also provides a means of minimizing potential problems related to beaver activity by identifying methods that limit the height of the pond water such as use of a pond leveler (Boyle and Savitzky 2008; Brown and Brown (eds), no date; Lisle 1996; 2003). And therefore there would be no increase in turbidity and loss of channel complexity under this alternative.

Suction Dredging

Suction dredging is permitted under the ODEQ 700PM permit (**Appendix 4A**) and contains terms and conditions. Additional terms and conditions exist when suction dredging is proposed on streams 303(d) listed for sediment and/or in essential salmon habitat (Schedule C.19). This analysis assumes that the miners would be in compliance with the 700PM permit (**Appendix 4A**) and all its requirements.

The analysis area for suction dredging is the Plan area boundary. It is explicitly specified because the State 700PM permit only asks the miner for a Township, Range and Section.

Under Alternatives 2 and 3, eight Plans propose to suction dredge (**Table 3-16**). Details of the analysis related to suction dredging for each Plan is found in **Appendix 7** and is summarized below.

Table 3-16: Plans proposing to Suction Dredge, the stream's 303(d) status and essential salmon habitat status by Subwatershed (SWS)

SWS Name	Plan	Creeks	Stream Length Authorized for Suction Dredging (feet)	Width of Stream Disturbance (ft)	303d listed in area of proposed activity	In essential salmon habitat
Beaver Creek SWS						
	Sunshine McWillis	McWillis Gulch	1500	10	No	No
	Yellow Jacket	Orofino Gulch	1000	10	No	No
Bull Run SWS						
	Blue Sky/Bull Run	Bull Run	12000	10	0 to 9.3 RM for sedimentation	Yes
Clear Creek SWS						
	Lightning	Lightning	3000	15	No	Yes
Lower Granite SWS						
	Blue Smoke	Granite	300	15	No	Yes
	Little Cross 1	Granite	500	15	No	Yes
Upper Granite SWS						
	Old Eric 1&2	Granite	500	4	No	Yes

Site Characteristics

The channel beds of the five streams in the areas proposed for suction dredging are predominantly cobbles with some gravels and sands. Because these streams were historically placer mined, the percentage of the silts and clays in the channel bed is expected to be limited. The only source of abundant fine-grained material would be the stream banks. However, no mining or destabilizing of the stream banks is permitted under the 700PM permit (Schedule C.5, 6, 7 and 8). The abundance of cobbles makes the channel bed highly stable and not prone to headcut.

Impacts to Channel Morphology and Water Quality

The following stream channel morphology and water quality parameters were evaluated for potential changes as a result of suction dredging: pool frequency and distribution, habitat complexity (e.g. log jams, instream wood, beaver dams), stream temperatures, turbidity, and substrate, and channel bed stability (**Appendix 4B**). The potential impacts are the same for all Plans because stream characteristics are similar.

Pool frequency and distribution: Localized changes in pool frequency and locations related to suction dredging as dredging would create pools and loosen the substrate. The pool created by suction dredging would persist (except in the case of a large flood event) because the amount of bedload moving through these streams is limited based on the composition of the channel beds (dominated by cobbles), the amount of historic placer mining of the streams, and the fact that any inputs from the stream banks would be predominantly sands, gravels, silts and clays. Fine sediment entering the streams from the

banks and the sediment disturbed by suction dredging would be redistributed downstream during spring high flow.

Habitat complexity: Potential local change to habitat complexity because boulders and habitat structures may be moved around in the stream but not removed. Therefore, the impacts of suction dredging on in-channel habitat complexity may occur but should be limited to small areas. The changes would be permanent because the boulders and habitat structures would have been permanently moved.

Schedule C.6 prohibits removing or disturbing boulders, rooted vegetation, or embedded woody plants and other habitat structures from the stream banks. Habitat connected to the stream banks (beaver dams, undercuts, root wads etc.) would therefore remain intact, thereby ensuring that some key habitat types would not be modified.

Stream temperatures: No changes to stream temperatures because suction dredging would not alter stream channel widths, channel depths, remove stream side shade or alter groundwater flows.

Turbidity: Local change on water clarity could occur, as represented by changes in turbidity. Turbidity could extend beyond the immediate area that is dredged but changes in water clarity are not allowed under the 700 PM permit to extend beyond 300 feet downstream. However, given the past history of placer mining in this stream, fines are expected to be limited in the channel bed, and therefore the turbidity plume is expected to dissipate much sooner than 300 feet downstream. In addition, the turbidity plume would only occur when dredging is occurring. Therefore, the temporal impact would be limited to the when the miner is suction dredging.

Existing beaver dams or future dams would be protected because they would be considered structures based on the description provided under Schedule C.8 of the ODEQ 700PM suction dredging permit. Schedule C.8 states “*Removal of habitat structure that extends into the stream channel from the stream bank is also prohibited*”. Beaver dams meet these criteria as they extend from the stream bank into the stream channel and provide habitat for fish. Schedule C.8 requirement eliminates the concern about increased turbidity because it ensures that the sediment behind the beaver dams would remain stored.

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, passes it up through a suction hose, and runs it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location, with respect to existing condition, would be permanent but highly localized.

Channel bed stability: No changes to channel bed stability are expected, even though dredging would create pools, because the channel bed is composed of cobbles, sand and gravel. Therefore, no headcutting and bed destabilization is expected to occur.

In summary, suction dredging would have the same impact under Alternatives 2 and 3. Suction dredging would have a localized impact on 1) pool frequency and distribution, 2) habitat complexity, 3) turbidity and 4) substrate for the reasons stated above. Impacts to turbidity would be restricted to the time an area was being dredged. Changes to pool frequency and distribution, habitat complexity and substrate would

likely persist beyond a couple of seasons. However, the changes would not result in any measureable impact to water quality, channel complexity or channel stability under Alternatives 2 or 3 because they would be so localized.

PACFISH

Compliance with MM-2

Structures located inside Riparian Habitat Conservation Areas (RHCA) were evaluated for compliance with PACFISH MM-2 as it pertains to potential impacts to 1) streams and 2) RHCAs (terrestrial impacts). Compliance with MM-2 as it pertains to FISHERIES is found in the *Fisheries Section* of Chapter 3.

MM-2: *Locate structures, support facilities, and roads outside Riparian Habitat Conservation Areas. Where no alternative to siting facilities in Riparian Habitat Conservation Areas exists, locate and construct the facilities in ways that avoid impacts to Riparian Habitat Conservation Areas and streams and adverse effects on listed inland native fish [or anadromous fish].*

Where no alternative to road construction exists, keep roads to the minimum necessary for the approved mineral activity. Close, obliterate and revegetate roads no longer required for mineral or land management activities.

The following features are considered structures:

- a) Ponds: Source water ponds (used to withdraw water from for processing) and settling ponds (would receive sediment created by processing)
- b) Roads: Temporary mine-access roads and Forest Service closed or decommissioned roads
- c) Bridges: Proposed and existing bridges.

Ponds inside RHCAs

All but seven Plans have existing or proposed ponds located inside an RHCA under both alternatives. The Plans with ponds outside the RHCA are Bunch Bucket, Lucky Strike, Rosebud, Royal White, Ruby, and Yellow Jacket. Field observations and Plan descriptions for all the ponds are found in **Appendix 3**, along with a conclusion that addresses compliance with MM-2.

With respect to locating a pond inside RHCA

Plans with ponds inside the RHCA are in compliance with respect to locating a pond inside an RHCA under Alternatives 2 and 3 for the following reasons:

1. Ponds on the flat valley floor where groundwater, the dominant source of pond water, is accessible at shallow depths,
2. Ponds dug into the ground,

3. Ponds are in highly stable locations,

If the ponds were to be moved outside the RHCA, they would be placed on hillsides where soils are shallow and slopes are steeper. This alternate location (on hillslopes) creates a risk of pond failure because the shallow hillside sediments would become saturated. As pore pressure builds up at the interface between the sediments and a less porous zone (i.e. underlying bedrock), the sediments become mobile, resulting in a small debris flow or gulying. The relocated ponds would also be less likely to tap into shallow groundwater, would eliminate the miner's water source for the ponds (groundwater), and be more distant from their mining activity. This would require additional equipment and/or disturbance to bring the water to the mining site or materials to the ponds.

With respect to water quality or activity inside an RHCA

Under Alternative 2, nine Plans have ponds that would NOT be in compliance with MM-2 as it pertains to water quality or activity inside an RHCA (**Table 3-17**). These ponds either have 1) the potential to discharge sediment and/or heavy metals into a creek during use and/or construction and therefore locally alter water quality, or 2) locations that were not identified by the miner, therefore a compliance call could NOT be made.

Under Alternative 3, all Plans with ponds would be in compliance with MM-2 as a result of the addition of Forest Service WRPMs and/or General Requirements.

Table 3-17: Comparison of Ponds inside RHCAs that are NOT in compliance with MM-2 under Alternative 2 versus Alternative 3 by Subwatershed (SWS)

SWS Name	Plan	Pond	Alternative 2	Alternative 3	National Forest
Beaver Creek SWS					
	Olive Tone	Proposed settling ponds	<u>Construction:</u> Construction of proposed ponds would be in compliance with MM-2. <u>Use:</u> Use of ponds would NOT be in compliance because pond has the potential to discharge sediment into Olive Creek via subsurface flow and by remobilizing bank sediment when pond water re-emerge along the bank.	<u>Construction:</u> Same as Alt. 2. Construction in compliance with MM-2. <u>Use:</u> Different than Alt. 2. Use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs	WWNF
	Sunshine McWillis	Proposed source water and settling pond at processing site 2	Construction and use of the proposed pond would NOT be in compliance because pond would be in McWillis Gulch and discharge sediment into the Gulch and Olive Creek downstream during high flows.	Dropped under Alt. 3	WWNF
Lower Granite SWS					

SWS Name	Plan	Pond	Alternative 2	Alternative 3	National Forest
	Hopeful 2, 3	Proposed construction and use of source water and settling ponds on North side of Granite Creek	Construction and use of the proposed pond would NOT be in compliance because protection measures are not in place to prevent sediment from reaching Granite Creek.	<u>Construction and Use:</u> Different than Alt. 2. Construction and Use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs	UNF
	Little Cross	Proposed source and settling pond	Use NOT in compliance because pond would be in road that slopes towards Granite Creek. Potential for discharge during construction and use.	Different than Alt. 2. Pond use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs	WWNF
	Troy D	Existing settling ponds	Use of ponds would NOT be in compliance because ponds have the potential to discharge sediment from the pond into Granite Creek via subsurface flow and by remobilizing bank sediment when pond water re-emerge along the bank.	Different than Alt. 2. Use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs	WWNF
Upper Granite SWS					
	Eddy Shipman (lode portion)	Existing source and settling ponds	. Use NOT in compliance because the lower ends of the existing ponds are not bermed sufficiently to prevent water, sediment, and heavy metals from entering into the adjacent wet meadow and into the creek.	Different than Alt. 2. Use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs and General Requirements.	WWNF side
	Old Eric	Existing settling pond	Use NOT in compliance because pond has the potential to discharge warm water into Granite Creek.	Different than Alt. 2. Pond use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs	UNF
	Tetra Alpha Mill and Lode	Existing settling ponds	Use NOT in compliance because ponds have potential to discharge heavy metals in solution into Boulder Creek as pond water seeps through fill.	Different than Alt. 2. Use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs and General Requirements.	WWNF
	Yellow Gold	Proposed settling ponds	Unknown. Compliance could not be analyzed because no location provided	Different than Alt. 2. Construction and use would be in compliance as a	WWNF

SWS Name	Plan	Pond	Alternative 2	Alternative 3	National Forest
				result of the addition of FS WRPMs.	

Roads inside RHCAs

All Plans, except Lucky Strike, Royal White, and Yellow Jacket have at least one road that is inside an RHCA (**Appendix 6**). The assessment of effect (**Appendix 7**) and compliance with PACFISH MM-2 (**Appendix 3**) were based on road distance from the creek, topography, and ground cover.

Under Alternative 2 there are six operations with roads inside RHCAs that would not be in compliance with MM-2 (**Table 3-18**). The roads would not be in compliance because there was the potential for a discharge and/or there would be new detrimental soil disturbance inside the RHCA, and no provisions were made for minimizing disturbance and restoring road bed once mining was done.

Under Alternative 3, all roads would be in compliance with MM-2 as a result of the addition of Forest Service WRPMs and/or General Requirements.

This page intentionally left blank

Table 3-18: Comparison of Roads proposed for Use that would NOT be in Compliance with PACFISH MM-2 under Alternative 2 versus Alternative 3 by Subwatershed (SWS).

(E = Existing non system road. P = Proposed, miner created road. None are cut and fill)

SWS Name	Plan	Road Number	Existing Condition	Creek	RHCA type	RHCA width (ft)	Compliance with MM-2		Reason for non-compliance
							Alt 2	Alt 3	
Beaver Creek SWS									
	Altona	1042M1a	Temporary - P	Quartz Gulch	Intermittent, fish bearing	300	no	Yes	Alt. 2: There would be new detrimental soil condition (DSC) but no provisions for minimizing disturbance and restoring road bed once mining is done. Alt 3: FS General Requirements would minimized disturbance and restore the road
Bull Run SWS									
	Blue Sky/Bull Run	7300-M4a	Temporary - P	Bull Run	Perennial, fish bearing	300	no	Yes	Alt. 2: Potential for a discharge of sediment and there would be new detrimental soil conditions but without provision for minimizing disturbance and restoring road bed. Alt. 3: Potential discharge would be eliminated as a result as FS WRPMsand FS General Requirements would minimized disturbance and restore the road
	Blue Sky/Bull Run	7375-M1a	Temporary - E	Bull Run	Perennial, fish bearing	300	no	Yes	Alt. 2: There would be potential for a discharge of sediment and new detrimental soil conditions but without provision for minimizing disturbance and restoring road bed. Alt. 3: Potential discharge would be eliminated as a result as FS WRPMs and FS General Requirements would minimized

SWS Name	Plan	Road Number	Existing Condition	Creek	RHCA type	RHCA width (ft)	Compliance with MM-2		Reason for non-compliance
							Alt 2	Alt 3	
									disturbance and restore the road bed
Clear Creek SWS									
	Ruby Group	1310-E1a	Temporary - E	Ruby and Clear	Ruby Ck = Intermittent, fish bearing, Clear Ck = Perennial, fish bearing	300	no	Yes	Alt 2: Potential for a discharge. Alt 3: Potential would be eliminated with the addition of FS WRPMs
	Ruby Group	1310-E1a	Temporary - E	Ruby and Clear	Ruby Ck = Intermittent, fish bearing, Clear Ck = Perennial, fish bearing	300	no	Yes	Alt 2: Potential for a discharge. Alt 3: Potential would be eliminated with the addition of FS WRPMs
Lower Granite SWS									
	Hopeful 2, 3	1035-E1d	Temporary - E	Granite	Perennial, fish bearing	300	no	Yes	Alt 2: Potential for a discharge. Alt 3: Potential would be eliminated with the addition of FS WRPMs
Upper Granite SWS									
	Eddy Shipman	7300680	FS Closed	Granite	Perennial, fish bearing	300	no	Yes	Alt 2: Potential for a discharge. Alt 3: Potential would be eliminated with the addition of FS WRPMs
	Eddy Shipman	7300-E1d	Temporary - E	Granite	Perennial, fish bearing	300	no	Yes	Alt 2: Potential for a discharge. Alt 3: Potential would be eliminated with the addition of FS WRPMs

SWS Name	Plan	Road Number	Existing Condition	Creek	RHCA type	RHCA width (ft)	Compliance with MM-2		Reason for non-compliance
							Alt 2	Alt 3	
	Tetra Alpha Placer	7355-M3b	Temporary - P	Boulder	Perennial, fish bearing	300	no	Yes	Alt. 2: There would be new detrimental soil condition but no provisions for minimizing disturbance and restoring road bed once mining is done. Alt 3: FS General Requirements would minimized disturbance and restore road bed
	Tetra Alpha Placer	7355-M3c	Temporary - P	Boulder	Perennial, fish bearing	300	no	Yes	Alt. 2: There would be new detrimental soil condition but no provisions for minimizing disturbance and restoring road bed once mining is done. Alt 3: FS General Requirements would minimized disturbance and restore road bed
	Tetra Alpha Placer	7355-M3d	Temporary - P	Boulder	Perennial, fish bearing	300	no	Yes	Alt. 2: There would be potential for a discharge of sediment and new detrimental soil conditions but without provision for minimizing disturbance and restoring road bed. Alt. 3: Potential discharge would be eliminated as a result as FS WRPMs and FS General Requirements would minimized disturbance and restore the road bed

This page intentionally left blank.

Proposed and Existing Bridges

Under Alternative 2, nine bridges are proposed for use (**Table 3-19**). Six are existing bridges and three are proposed. Of the nine bridges, two would not be in compliance with MM-2 as a result of the potential for a discharge during placement and removal (**Appendices 3 and 7**).

Under Alternative 3, all of the bridges would be in compliance with MM-2.

Table 3-19: Plans proposing use of bridges inside the RHCA. Comparison of Compliance with MM-2 under Alternatives 2 and 3 by SWS

			Compliance with MM-2	
SWS Name	Plan	Bridge	Alt 2	Alt 3
Beaver Creek SWS				
	Sunshine McWillis	Existing bridge across McWillis Gulch	Yes because is an existing stable bridge and required to access the site.	Same as Alt. 2. Would be in compliance
Bull Run SWS				
	Blue Sky Bull Run	Proposed temporary bridge across Bull Run Creek to access Bull Run site 2	no	Dropped under Alt 3. Replaced with TA road 7375-M1b which is in compliance.
	Blue Sky Bull Run	Existing wooden bridge across Swamp Creek	Yes because is an existing stable bridge and required to access the site.es	Same as Alt. 2. Would be in compliance
Clear Ck SWS				
	Grubsteak	Existing bridge across Clear Creek	Yes because is an existing stable bridge and required to access the site.	Same as Alt. 2. Would be in compliance
	Lightning	Existing bridge across Lightning Creek	Yes because is an existing stable bridge and required to access the site.	Same as Alt. 2. Would be in compliance
	Ruby	Proposed temporary ATV bridge across Clear Creek	no	Yes as a result of the addition of FS WRPMs
Lower Granite SWS				
	East Ten Cent	Existing foot bridge across East Ten Cent	Yes because is an existing stable bridge and required to access the site.	Same as Alt. 2. Would be in compliance
Upper Granite SWS				
	Old Eric 1&2	Existing bridge across Granite Creek	Yes because is an existing stable bridge and required to access the site.	Same as Alt. 2. Would be in compliance
	Yellow Gold	Proposed foot bridge	yes because planks would be hand placed and no soil disturbance or discharge potential	Same as Alt. 2. Would be in compliance

Riparian Management Objectives (RMOs)

Each Plan was evaluated to determine if there would be changes to any of the RMOs (**Appendix 7**). The mining areas are considered points along the stream because the areas proposed for mining are all less than 10 acres, with most less than 5 acres and the length of stream that they could potentially influence in all cases is less than 300 feet. Therefore, the RMO standards do not apply because the standards are not designed to be evaluated at a specific point along the stream. Instead, the activities were examined for potential impacts to the RMO parameters, not the RMO standards. The seven RMO parameters are identified in PACFISH (1995) that relate to streams. They are Pool Frequency, Water Temperature, Large Woody Debris, Substrate Sediment, Bank Stability, Lower Bank Angle, and Width/Depth ratio.

Under Alternative 2, ten Plans have the potential to locally (300 feet or less) affect one or more RMO parameters (**Table 3-20**). RMO parameters affected are 1) pool frequency and substrate related to suction dredging and/or erosion of a road and 2) stream temperature related to input of warm water, reversal of groundwater flow, or water withdrawal.

Under Alternative 3, nine Plans have the potential to locally (300 feet or less) affect one or more parameters (**Table 3-20**). The addition of Forest Service WRPMs for Grubsteak eliminated its potential to impact the stream temperature RMO as a result of groundwater flow reversal. The addition of Forest Service WRPM for Old Eric 1&2 eliminated its potential to impact stream temperature RMO as a result of the input of warm water. The remaining RMO parameters affected are 1) pool frequency and substrate related to suction dredging and/or erosion of a road and 2) stream temperature related to water withdrawals. A brief description of the potential impacts to the RMO parameters under Alternatives 2 and 3 is found following **Table 3-20**.

Table 3-20: Plans with the Potential to alter a Riparian Management Objective (RMO) Parameter under Alternatives 2 and 3 by Subwatershed (SWS)

SWS Name	Plan	RMO affected	Alternative 2	Alternative 3
Beaver Creek SWS				
	Belvedere	Stream temperature	<u>Water withdrawal:</u> Potential increase in stream temperature	Different than Alt. 2. Potential increase in stream temperatures remains but restricted to time period prior to August 15 because water withdrawals would not occur after August 14.
	Olive Tone	Stream temperature	<u>Water Withdrawal:</u> Potential increase in stream temperature	Different than Alt. 2. Potential increase in stream temperatures remains but restricted to time period prior to August 15 because water withdrawals would not occur after August 14.
Bull Run SWS				
	Blue Sky Bull Run	Pool frequency and Substrate	<u>Suction Dredging:</u> Potential local changes	Same as Alt. 2
Clear Creek SWS				
	Grubsteak	Stream temperature	<u>Groundwater Flow Reversal:</u> Potential local increase in stream	Different than Alt. 2. Potential increase in stream temperatures prevented as a result of the addition

SWS Name	Plan	RMO affected	Alternative 2	Alternative 3
			temperature downstream	of FS WRPMs.
	Lightning	Pool frequency, Substrate, and Stream temperature	<u>Suction Dredging:</u> Potential local changes to pool frequency and substrate <u>Water withdrawals:</u> Potential increase in stream temperature	Suction Dredging: Same as Alt. 2 Water withdrawals: Different than Alt. 2. Potential increase in stream temperatures remains but restricted to July 1 to August 14 as a result of FS Fish Protection Measures
Lower Granite SWS				
	Blue Smoke	Pool frequency and Substrate	<u>Suction Dredging:</u> Potential local changes	Same as Alt. 2
	Little Cross	Pool frequency and Substrate	<u>Suction Dredging:</u> Potential local changes	Same as Alt. 2
Upper Granite SWS				
	Old Eric 1 & 2	Pool frequency, Substrate and Stream temperature	<u>Suction Dredging:</u> Potential local changes in pool frequency and substrate <u>Input of Warm Water:</u> potential increase in stream temperature	Suction Dredging: Same as Alt. 2 Input of Warm Water: Different than Alt. 2. Potential input of warm water causing local increases in stream temperatures prevented as a result of the addition of FS WRPM
	Tetra Alpha Placer	Stream temperature	<u>Water Withdrawal:</u> Potential increase in stream temperature	Different than Alt. 2. Potential increase in stream temperatures <u>remains but restricted</u> to time period prior to August 15 because water withdrawals would not occur after August 14.
	Tetra Alpha Mill and Lode	Stream temperature	<u>Water Withdrawal:</u> Potential increase in stream temperature	Different than Alt. 2. Potential increase in stream temperatures <u>remains but restricted</u> to time period prior to August 15 because water withdrawals would not occur after August 14.

Pool Frequency: Under both alternatives, pool frequency changes related to suction dredging would be localized to where dredging creates pools and loosens the substrate. The pool created by suction dredging would persist (except in the case of a large flood event) because the amount of bedload moving through these streams is limited based on the composition of the channel beds (dominated by cobbles), the amount of historic placer mining of the streams, and the fact that any inputs from the stream banks would be predominantly sands, gravels, silts and clays. Fine sediment entering the streams from the banks and the sediment disturbed by suction dredging would be redistributed downstream during spring high flow.

Substrate sediment: Under both alternatives, local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, passes

it up through a suction hose, and runs it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. While a number of Plans have the potential to discharge sediment into creeks from mining activities on land, this discharge would not alter substrate because inputs would be largely sands, silts and clays move through the system as suspended load.

Stream temperature: Under Alternative 2 the potential to alter stream temperatures exists as a result of 1) water withdrawals by Belvadear (Olive Creek), Lightning (Lightning Creek), Olive Tone (Olive Creek), Tetra Alpha Placer (Boulder Creek) and Tetra Alpha Mill & Lode (Boulder Creek) Plans, 2) warm water inputs from Old Eric 1&2 (Granite Creek), or 3) groundwater reversal at Grubsteak (Clear Creek). The temperature changes related to input of warm water or groundwater reversal would occur locally. Temperature changes related to water withdrawals at the five Plans noted above have the impact to affect downstream temperatures. The changes would not be permanent but tied to the period when the mining activity was occurring. The potential exists anytime during the summer.

Under Alternative 3, the number of Plans that could alter stream temperatures decreases. The potential to impact stream temperatures as a result of inputs of warm water (Old Eric 1&2) or groundwater reversals (Grubsteak) would be eliminated as a result of the addition of Forest Service WRPMs to these two Plans. However, potential impacts to temperatures from the five Plans that propose to withdraw water from Boulder, Lightning, or Olive Creeks remains. However, the period of time in which changes in stream temperatures related to water withdrawals could occur would decrease as the result of Forest Service Fish Protection Measures. These Fish Protection Measures limit withdrawals to the time period prior to August 15. However, the water withdrawals would still occur during the warmest part of the summer and have the potential to affect stream temperatures and stream flows during that period of time.

Effects on Wetlands and Floodplains

Executive Order 11990 (Protection of Wetlands) requires government agencies to take actions that “avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands.” EO 11990 (Sec 2 (a)(1 and 2) further states “shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such constructions, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use...”

Executive Order 11988 (Protection of Floodplains) requires government agencies to take actions that reduce the risk of loss due to floods, to minimize the impact of floods on human health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Executive Order 11988 defines the term “floodplain” as follows: “...that area subject to a one percent or greater change of flooding in any given year.”

Under Alternatives 2 and 3, five operations propose some activity in either wetlands and/or floodplains (**Table 3-21**). These portions of their Plans are examined for compliance with Executive Order 11990 (Protection of Wetlands) and Executive Order 11988 (Protection of Floodplains).

Under Alternative 2, one Plan would not be in compliance with EO 11990 (Floodplains) and two Plans would not be in compliance with EO 11988 (Wetlands) for the reasons listed in **Table 3-21**.

Under Alternative 3, all Plans would be in compliance with EO 11990 (Floodplains) and EO 11988 (Wetlands). The reduction is the result of the addition of Forest Service WRPMs and/or General Requirements W1-3 (**Table 3-21**).

Table 3-21: Plans with Activity Proposed in Wetlands and Floodplains

Compliance with Executive Orders Protecting Wetlands and Floodplains under Alternatives 2 and 3 by Subwatershed (SWS)

SWS	Plan	Wetland or Floodplain	Alternative 2	Alternative 3
Beaver Creek SWS				
	Belvadear	Mining would occur in a wetland that has developed between the berm along Olive Creek and the road. Abundant riparian vegetation and ponds exist in this area. The wetland area is connected via subsurface flow to Olive Creek. Wetlands in the area are limited as a result of past mining activity.	<u>Not in compliance with EO 11990 (Wetlands)</u> because the Plan does not clearly state what miner proposed to do to “minimize harm to the wetlands” and ensure restoration of their function once mining activity is completed.	<u>Different than Alt. 2.</u> Plan <u>would be in compliance with EO 11990</u> as a result of the addition of FS General Requirements W1, 2, and 3 (Appendix 2) which would “minimize harm to the wetlands” and ensure restoration of their function to the extent possible once mining activity is completed.
Bull Run SWS				
	Blue Sky Bull Run	Mining activity at Blue Sky Site 3 would be in the active to 5 year floodplain of Bull Run Creek.	<u>Not in compliance with EO 11988 (Floodplains)</u> because Plan does not ensure that mining in this area would not have impacts beyond a season as it pertains to floodplain function. Because vegetation would be removed during mining, there is the potential for the spring high flows to erode some of the material mined and create a new channel in the floodplain, as well as discharge sediment into the creek.	<u>Different than Alt. 2.</u> Plan <u>would be in compliance with EO 11988</u> as a result of the addition of FS WRPM which requires that the hole be filled at the end of the season and the disturbed area seeded and covered with straw
Upper Granite SWS				
	Tetra Alpha	A two-track road would be created across a wet	<u>Not in compliance with EO 11990 (Wetlands)</u> or	<u>Different than Alt. 2.</u>

SWS	Plan	Wetland or Floodplain	Alternative 2	Alternative 3
	Placer	meadow/floodplain to access a portion of the Stage 2 mining area on the south side of Boulder Creek.	EO 11988 (Floodplains) because the Plan does not clearly state what miner proposed to do to “minimize hard to the wetlands” and ensure restoration of their function once mining activity is completed. Plan does not ensure that the two-track road would not lead to the development of a channel related to road erosion. A new channel could alter groundwater flows and potentially trigger gully development in the wet meadow.	Plan would be in compliance with Executive Order 11988 (Protection of Floodplains) and Executive Order 11990 (Protection of Wetlands) as a result of the addition of Forest Service WRPMS and General Requirements (Z1 through Z14). These requirements eliminate the potential for road erosion by rocking portions of the road, locating the rock with input from Forest Service personnel, and ensuring appropriate reclamation when no longer needed.

Comparison of Alternatives

The effects to water resources for the three alternatives are summarized below in **Table 3-22**. The reduction of effects under Alternative 3 is the result of the addition of Forest Service WRPMS (Appendix 1A) and General Requirements (Appendix 2).

Table 3-22: Comparison of Effects to Water Resources

Impacts	Alt1 1	Alt 2	Alt 3
Clean Water Act, Section 401 related			
Plans with potential to discharge sediment into a creek	4	16	2
Plans with potential to discharge heavy metals into a creek	0	3	0
Plans with potential to discharge warm water into a creek	0	1	0
Plans with potential to discharge creosote into a creek	2	0	0
Clean Water Act, Section 303(d) (antidegradation)			
Plans NOT in compliance with respect to sedimentation	0	0	0
PACFISH: Compliance with MM-2 (structures inside the RHCA)			
Plans NOT in compliance with respect to Ponds	0	9	0
Plans NOT in compliance with respect to Roads	0	6	0
Plans NOT in compliance with respect to Bridges	0	2	0
PACFISH: Riparian Management Objectives (RMOs)			
Plans with impacts to RMOs (very localized)	0	10	9
Compliance with Executive Order 11990 (Wetlands)			
Plans NOT in compliance	0	2	0
Compliance with Executive Order 11988 (Floodplains)			
Plans NOT in compliance	0	1	0
Other Water Resource impacts			

Impacts	Alt1 1	Alt 2	Alt 3
Plans with potential to alter stream temperatures due to water withdrawals	0	5	5
Plans with potential to alter stream temperatures related to inputs of warm water	0	1	0
Plans with potential to alter stream flow due to water withdrawals	0	5	5
Plans with potential to alter stream flow due to groundwater flow reversal	0	1	0

Soil Resources – Effects Analysis

All placer mining will occur on alluvial soil that has formed along creeks or on hillslopes. In most cases the areas along the creeks have already been disturbed from past mining activity. For Plans that include placer mining, surface material would be removed and gold bearing material removed and processed through a trommel or similar equipment. However, the scope of proposed activity varies greatly between Plans. Each Plan has a specific reclamation plan; designed to restore the site after mining is completed. Generally topsoil is removed and stocked piled. After mining is complete, excavated areas are refilled with the processed material and are recontoured. The stored topsoil is spread over the surface and grass is seeded. Although the mined sites would be returned to near normal contours and stabilized by seeding, soil structure would be damaged by the operations. It is unknown how long it will take for these soils to return to natural conditions.

Alternative 1

Direct/Indirect Effects

Under Alternative 1 of the Granite Mining Project, the Forest Service would not change management in the project area but would require that past NEPA decisions related to these Plans be implemented. While there would be no proposed mining under this alternative, there are connected reclamation activities.

Potential effects to soil resources from these reclamation activities are shown in **Table 3-23**. There are either no changes to existing conditions despite reclamation activities because no actions were identified that would improve soil productivity or the potential for a localized increase in soil erosion related to removing structures and exposing the underlying soil.

Table 3-23: Effects to Soil Resources under Alternative 1

SWS Name	Plan	Creek	Alternative 1	Soil Resources Effects
Beaver Creek SWS				
	Altona	Quartz Gulch	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.

SWS Name	Plan	Creek	Alternative 1	Soil Resources Effects
	Belvadear Group	Olive Creek	Equipment would be removed	NO CHANGE from existing condition because no activity proposed.
	L&H	Olive Creek	Shed would be removed	POTENTIAL for localized soil erosion where the shed once stood because no measures were identified to reduce cover the bare ground and prevent erosion.
	Olive Tone	Olive Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Royal White Group	Irish Gulch	Cabins would be removed, Adits would be gated.	POTENTIAL for localized soil erosion where the cabins once stood because no measures were identified to reduce cover the bare ground and prevent erosion.
	Sunshine/McWillis	McWillis Gulch	Cabins and road 1305-M1a would be removed	POTENTIAL for localized soil erosion where the cabins once stood because no measures were identified to reduce cover the bare ground and prevent erosion. NO CHANGE from existing soil resources related to road removal because no measures were identified to reduce the soil compaction and improve soil productivity after removal.
	Yellow Jacket	Orofino Gulch	Spring development and sheds would be removed. Site would remain as is.	POTENTIAL for localized soil erosion where the sheds once stood because no measures were identified to reduce cover the bare ground and prevent erosion.
Bull Run Creek SWS				
	Blue Sky/Bull Run	Bull Run Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
Clear Creek SWS				
	Bunch Bucket	Clear Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Grubsteak	Clear Creek	Bridge, equipment, & shed removed, the large hole would be filled in.	POTENTIAL for localized soil erosion where the shed once stood because no measures were identified to reduce cover the bare ground and prevent erosion. NO CHANGE from existing soil

SWS Name	Plan	Creek	Alternative 1	Soil Resources Effects
				resources related to filling in the large hole because no measures were identified to improve soil productivity of the filled-in hole. NO CHANGE related to removal of the bridge because removal would not alter existing soil conditions except at the bridge and this amount would not alter existing soil conditions at the subwatershed scale.
	Lightning Creek	Lightning Creek	Bridge removed. Cabins maintained as historical structure.	NO CHANGE related to removal of the bridge because removal would not alter existing soil conditions except at the bridge and this amount would not alter existing soil conditions at the subwatershed scale.
	Lucky Strike	Lightning Creek	Cabins maintained as historical structure	NO CHANGE from existing condition because no activity proposed.
	Ruby Group	Ruby & Clear Creek	Cabin would be removed	POTENTIAL for localized soil erosion where the cabin once stood because no measures were identified to reduce cover the bare ground and prevent erosion.
Lower Granite SWS				
	Blue Smoke	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	East Ten Cent Creek	East Ten Cent Creek	Cabin and road 7350-M1a would be removed	POTENTIAL for localized soil erosion where the cabin once stood because no measures were identified to reduce cover the bare ground and prevent erosion. NO CHANGE from existing soil resources related to road removal because no measures were identified to reduce the soil compaction and improve soil productivity after removal.
	Hopeful 1	Granite Creek	Cabin would be removed	POTENTIAL for localized soil erosion where the shed once stood because no measures were identified to reduce cover the bare ground and prevent erosion.

SWS Name	Plan	Creek	Alternative 1	Soil Resources Effects
	Hopeful 2&3	Granite Creek	Cabins and road 1035-E1b would be removed.	POTENTIAL for localized soil erosion where the cabins once stood because no measures were identified to reduce cover the bare ground and prevent erosion. NO CHANGE from existing soil resources related to road removal because no measures were identified to reduce the soil compaction and improve soil productivity after removal.
	Little Cross 1	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Rose Bud 1-4	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Troy D	Granite Creek	Equipment and gates would be removed	NO CHANGE from existing condition because no activity proposed.
Upper Granite SWS				
	City limits	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Eddy-Shipman	Granite Creek	Cabins would need to be removed. The adits would remained caved in.	POTENTIAL for localized soil erosion where the cabins once stood because no measures were identified to reduce cover the bare ground and prevent erosion.
	Make It	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Muffin	Last Chance Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Old Eric 1&2	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Tetra Alpha Placer	Boulder Creek	Equipment and roads 7355-M3a, and 7355-M3b would be removed.	NO CHANGE from existing soil resources related to road removal because no measures were identified to reduce the soil compaction and improve soil productivity of these roads.

SWS Name	Plan	Creek	Alternative 1	Soil Resources Effects
	Tetra Alpha Mill & Lode	Last Chance & Boulder Creek	Equipment and roads 7355-M4a and 7355-M4b would be removed.	NO CHANGE from existing soil resources related to road removal because no measures were identified to reduce the soil compaction and improve soil productivity of the road beds.
	Yellow Gold	Last Chance Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.

Alternatives 2 and 3

Direct/Indirect Effects

The amount of soil disturbed as a result of the Plans would not vary between Alternatives 2 and 3 (Table 3-24). However, under Alternative 3, there would be the addition of Forest Service General Requirements which are designed to accelerate the recovery of soil productivity and prevent soil erosion (Appendix 2). Therefore, the long-term effects under Alternative 3 would be less than the effects under Alternative 2. However, even with these additional measures, the length of time required to restore soil structure and soil productivity once it has been lost could be on the order of decades.

The Forest Service measures would prevent soil erosion both during the mining activity and after the area has been reclaimed. The importance of preventing soil erosion is two-fold. First, soil loss reduces the productivity of the site by reducing soil depth and therefore water storage capacity, organic- and nutrient-rich surface soils, and possibly rooting depth where soils are already thin. Secondly, a portion of the eroded soil become sediment in area streams, reducing water quality and modifying channel morphology in depositional reaches.

Table 3-24: Potential New Detrimental Soil Disturbances under Alternatives 2 and 3 by Subwatershed

SWS Name/Acres	Plan of Operation	Analysis Area for Each Plan (Acres)	New DSC (Acres)	% New DSC for SWS	
				Alt 2	Alt 3
Beaver Creek SWS (13,077.22 acres)					
	Altona	5	0		
	Belvadear Group	3	1.5		
	Bunch Bucket	10	8		
	L&H	8	1		
	Olive Tone	2	1		
	Royal White	3	0		
	Sunshine McWillis	2.5	1.5		
	Yellow Jacket	7.5	0		

SWS Name/Acres	Plan of Operation	Analysis Area for Each Plan (Acres)	New DSC (Acres)	% New DSC for SWS	
				Alt 2	Alt 3
SWS TOTAL		41	13	0.10	0.10
Bull Run Creek SWS (19,399.47 acres)					
	Blue Sky Bull Run	1.7	1.45		
SWS TOTAL		1.7	1.45	0.01	0.01
Clear Creek SWS (20,467 acres)					
	Grubsteak	2	2		
	Lightning Creek	5	2.5		
	Lucky Strike	2	1		
	Ruby	2.5	2.25		
SWS TOTAL		11.5	7.75	0.04	0.04
Lower Granite Creek SWS (20,283 acres)					
	Blue Smoke	1.75	1.5		
	East 10 Cent	2	2		
	Hopeful 1	1	0.25		
	Hopeful 2&3	3.5	3.5		
	Little Cross	1	0		
	Rosebud	5	3		
	Troy D	8	0		
	City Limits	1	1		
SWS TOTAL		23.25	11.25	0.06	0.06
Upper Granite Creek (9,313 acres)					
	Eddy Shipman	2.5	2.5		
	Make it	2	0.5		
	Muffin	2.5	2		
	Old Eric	1	0		
	Tetra Alpha Placer	8	8		
	Tetra Alpha Mill and Lode	2	0		
	Yellow Gold	9	9		
SWS TOTAL		27	22	0.24	0.24
PROJECT TOTAL		104.45	55.45		

Forest Plan Compliance

Refer to Appendix 9 for a complete discussion of Forest Plan compliance for water and soil resources. Alternative 3 would be in compliance with all applicable standards and guidelines for water and soil resources in both the WWNF and UNF Forest Plans. Alternative 2 would be in compliance with some, but not all applicable standards and guidelines in both Forest Plans.

This page intentionally left blank.

Fisheries

Introduction

Programs and activities on the Umatilla National Forest and Wallowa-Whitman National Forest are reviewed to determine how they may affect aquatic species listed under the Endangered Species Act (ESA) and the Regional Forester's Special Status Species List (as required under the National Forest Management Act). National Forest Service policy for any ESA or Regional Forester's listed species is stated in FSM 2670 and the U.S. Department of Agriculture Regulation 9500-4.

These responsibilities are implemented through Threatened, Endangered, and Sensitive Species Programs. The primary objectives of the Threatened, Endangered, and Sensitive Species Programs are to recover federally listed and proposed species and for Special Status/Sensitive species, to ensure that actions do not contribute to a loss of viability, or cause a significant trend toward listing under the ESA. The effects of any action authorized, funded, or carried out by the Forest Service on a Federally listed, Federally Proposed, or Special Status/Sensitive species is analyzed in a Biological Evaluation (Region Six Letter of Direction "Update of the Regional Forester's Special Status Species List" December 9, 2011 on file).

This analysis is considered the Fisheries Biological Evaluation and Specialist Report which satisfies all requirements of a Biological Evaluation required for the Granite Mining Project Environmental Impact Statement. In addition, the Granite Mining Biological Assessment (project file) analyzes and displays effects to Endangered Species Act (1973, as amended) listed species and their designated critical habitat in the project area.

Scale of Analysis and Affected Environment

Analysis Area

The analysis area within the North Fork John Day basin in the Granite Creek Watershed (1707020202) encompasses some 94,526 acres in North Eastern Oregon of lands managed by the US Forest Service, the Wallowa-Whitman National Forest (WWNF) (40,878 acres) and Umatilla National Forest (UNF) (49,262) and includes some 3,239 acres of private land (Table 3-25). There are approximately 25,000 acres of NFJD Wilderness, mostly on the UNF, in the Granite Watershed. The Analysis area sub-watersheds include Bull Run Creek, Lower Granite Creek, Upper Granite Creek, Beaver Creek, and Clear Creek. The sub-watershed scale of analysis was selected because effects from the proposed projects would likely be undistinguishable at the larger scale. There is no proposed activity in the Lake Creek subwatershed and it will not be further discussed in the analysis.

Table 3-25: Subwatersheds within the Granite Mining Analysis area

Subwatershed	HUC 6	Ownership			Total Acres
		UNF	WWNF	Other	
Beaver Cr.	170702020203	15	12,104	958	13,077
Bull Run Cr.	170702020202	0	18,765	634	19,399
Clear Cr.	170702020204	17,682	1,561	1,224	20,467
Lake Cr.	170702020205	11,884	0	54	11,938
Lower Granite Cr.	170702020206	17,954	1,055	1,273	20,282
Upper Granite Cr.	170702020201	2,003	7,138	172	9,313

Consultation with Regulatory Agencies

A biological assessment was submitted to NOAA Fisheries and USFWS on September 2, 2014. A biological opinion is expected to be received by December 31, 2014.

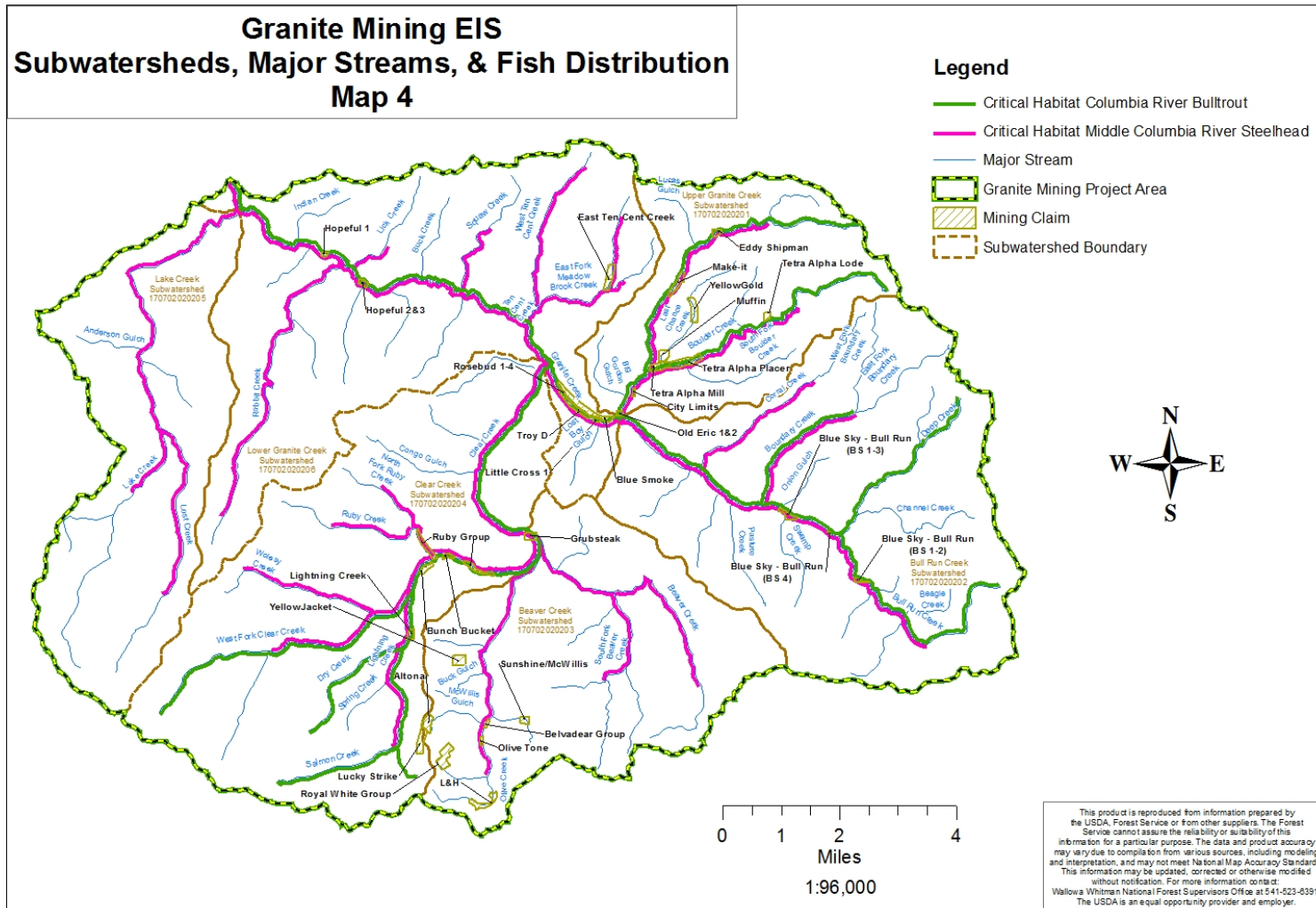
Fish Distribution and Habitat

Middle Columbia River (MCR) summer steelhead, bull trout and their designated critical habitat (DCH) are listed as threatened species under the Endangered Species Act (ESA) and are found in the Granite Watershed (Table 3-26 and Map 4). MCR steelhead and interior redband trout are both Forest Management Indicator species (MIS). See Appendix B of the Biological Assessment (BA) for a full description of MCR summer steelhead populations in the Upper North Fork John Day subbasin and Status of the Species in the BA for further discussion of ESA listed fish and Essential Fish Habitat (*UNF Forest Plan 4 – 59*).

Additional fish species found in the Granite Watershed include: Chinook Salmon (*Oncorhynchus tshawytscha*), reidsided shiner (*Richardsonius balteatus*), speckled dace (*Rhinichthys osculus*), longnose dace (*Rhinichthys cataractae*), sculpin (*Cottus spp.*), suckers (*Catostomidae spp.*), brook trout (*Salvelinus fontinalis*), mountain whitefish (*Prosopium williamsoni*), Westslope cutthroat trout (*Oncorhynchus clarki lewisi*), and lamprey (*Petromyzontidae spp.*). Several aquatic species, including Westslope Cutthroat Trout, are listed on the Regional Forester's Special Status Species List (see Table 3-31).

Table 3-26: Miles of ESA DCH and verified occupied habitat.

SWS (HUC 6)	Steelhead		Bull trout		Chinook EFH	
	Designated CH	Verified Occupied	Designated CH	Verified Occupied	Designated	Verified Occupied
Beaver Creek	11.3	11.3	0	0	0	0
Bull Run Creek	14.7	14.0	17.0	7.0	4.8	4.8
Clear Creek	18.8	20.0	24.1	17.8	4.5	4.5
Upper Granite Creek	8.0	7.1	11.8	9.5	0.8	0.8
Lower Granite Creek	24.0	24.0	9.8	9.8	9.8	9.8



Map 4 - Subwatershed, Major Streams, and Fish Distribution

This page intentionally left blank.

Table 3-27 displays by mine operation the nearest stream, and the proximity of each mine to steelhead and bull trout Designated Critical Habitat (DCH) and Essential Fish Habitat (EFH). Table 3-27 also summarizes known life history or habitat in the stream nearest to the claim. Table 3-28 displays by mine operation the proximity of each mine to steelhead and bull trout DCH, maximum area disturbed by mine claim, total possible disturbed area over the life of the proposed mine claim and size of new ponds proposed for construction. Table 3-29 displays the distribution of mining activities across the Granite Creek watershed.

The information provided in these three tables gives proximity of the mining activities to known and verified presence of aquatic species, or presumed if unknown but habitat is adequate for spawning and rearing habitat; and magnitude of disturbance of the riparian mining activity (excluding suction dredge mining) and distribution of the mining claims across the Granite watershed.

Suction dredge mining is proposed in seven Plans. It is not included in Tables 3-27 and 3-28 because the effects are not similar and cannot be compared to the other mining activities. Suction dredging is evaluated separately and described in the effects analysis section below.

It is important to note no chemicals are authorized for use (other than petroleum products for fuel, lubricants etc.) for any proposed mining operations. No chemical processing of materials would be allowed for any of the proposed Plans.

Refer to Map 4 for location of DCH and proximity to mine claims.

This page intentionally left blank.

Table 3-27: Mine operation and proximity to Steelhead and Bull Trout Designated Critical Habitat (DCH) and Essential Fish Habitat (EFH). Refer to Map 4 for location of DCH and proximity to mine claims.

Plan	Nearest Stream	Distance to Steelhead DCH	Distance to Bull Trout DCH (mi)	Mid-C Steelhead DCH		Mid-C Bull trout DCH		Chinook and EFH
				Rearing	Spawning	Rearing	Spawning	
Altona	Quartz Gulch	1.0 mile	> 5.0 mi.	Unknown ¹ Limited habitat	Unknown Limited habitat	N	N	N
Belvadear	Olive Creek	20 ft.	>5.0	Y	Y	N	N	N
Blue Smoke	Granite	>300 ft.	>300 ft.	Y	Y	Y	Y	Y
Blue Sky/Bull Run	Bull Run	30 ft.	30 ft.	Y	Y	Assumed	Assumed*	Y
Bunch Bucket	Clear Creek	150 ft.	150 ft.	Y	Y	Y	Y	Y
City Limits	Granite	200 ft.	200 ft.	Y	Y	Y	Y	Y
East Ten Cent	East Ten Cent Creek	10 ft.	2.0 miles	Y	N	N	N	Y
Eddy Shipman	Granite	10 ft.	10 ft.	Y	Y	Y	Y	Y
Grubsteak	Clear Creek	20 ft.	20 ft.	Y	Y	Y	Y	Y
Hopeful 1	Granite	150 ft.	150 ft.	Y	Y	Y	Y	Y
Hopeful 2 & 3	Granite	50 ft.	50 ft.	Y	Y	Y	Y	N
L&H Placer	Olive Creek	0.5 miles	>7.0 miles	Y	N	N	N	Y
Lightning Creek	Lightning Creek	150 ft.	150 ft.	Y	Y	Y	Y	Y
Little Cross I	Granite	50 ft.	50 ft.	Y	Y	Y	Y	Y
Make It	Granite	100 ft.	100 ft.	Y	Y	Y	Y	Y
Old Eric 1&2	Granite	150 ft.	150 ft.	Y	Y	Y	Y	Y
Olive Tone	Olive Creek	50 ft.	>5.0 miles	Y	Y	N	N	N
Rose Bud	Granite	200 ft.	200 ft.	Y	Y	Y	Y	Y
Ruby Group	Ruby Creek/Clear Creek	10 ft.	10 ft.	Y	Y	Clear-Y/ Ruby-N	Clear-Y/ Ruby-N	N
Sunshine/McWillis	McWillis Gulch	0.25 mile	>5.0 mile	N-Culvert barrier	N-Culvert Barrier	N	N	N
Tetra Alpha Placer	Boulder Creek	25 ft.	25 ft.	Y	Y	Assumed	Assumed*	N

¹ Unknown-spawning not documented and few biological surveys to confirm absence/presence

There are no ESA listed fish, DCH or hydrologic connectivity at/or near the following mine claims so they were not included in this table: Muffin, Lucky Strike, Royal White, and Yellow Gold.

Plan	Nearest Stream	Distance to Steelhead DCH	Distance to Bull Trout DCH (mi)	Mid-C Steelhead DCH		Mid-C Bull trout DCH		Chinook and EFH
				Rearing	Spawning	Rearing	Spawning	
Tetra Alpha Lode & Mill	Boulder Creek	25 ft.	25 ft.	Y	Y	Assumed	Assumed*	N
Troy D	Granite	25 ft.	25 ft.	Y	Y	Y	Y	Y
Yellow Jacket	Orofino Gulch	>0.25 miles	>5.0 miles	N	N	N	N	N
* habitat has inadequate spawning gravel and/or has temperature concerns								

Table 3-28: Mines, proximity of mines to steelhead and Bull Trout DCH, maximum area disturbed by mine claim, total possible disturbed area over the life of the proposed mine claim and size of new proposed ponds.

Plan	Distance to Steelhead DCH	Distance to Bull Trout DCH	Maximum Area of Active Surface Disturbance (in acres)	Total Area Potentially Disturbed from Mining Activities* (in acres)	Ponds E=use existing B=to be built
Altona	1.0 mile	> 5.0 mi.	.02	5	Build 2 10'x 20' x 6'
Belvadear	20 ft.	>5.0	.25	10	E
Blue Smoke	>300 ft.	>300 ft.	.01	2	E
Blue-Sky/Bull Run	30 ft.	30 ft.	.2	1.2	E
Bunch Bucket	150 ft.	150 ft.	.01	10	Expand E
City Limits	200 ft.	200 ft.	.01	2	E
East 10 Cent	10 ft.	2.0 miles	.01	2	E
Eddy Shipman	10 ft.	10 ft.	.25	.25	Build 2 10'x 20' x 6'
Grubsteak	20 ft.	20 ft.	.25	2	E
Hopeful 1	150 ft.	150 ft.	.01	1	E
Hopeful 2 & 3	50 ft.	50 ft.	.25	4	1 E, 1 B 10'x 10' x 10' 1 B 10' x 15' x 4'
L&H Placer	0.5 miles	>7.0 miles	.01	8	E
Lightning Creek	150 ft.	150 ft.	.12	5	E

Little Cross I	50 ft.	50 ft.	.25	.25	none
Lucky Strike	>2.0 miles	>2.0 miles	.01	2	none
Make It	100 ft.	100 ft.	.01	2	E
Muffin	0.25 miles	0.25 miles	.25	3	E
Old Eric 1&2	150 ft.	150 ft.	.01	1	E
Olive Tone	50 ft.	>5.0 miles	.02	2	Build 2 10'x 20' x 6'
Rose Bud	200 ft.	200 ft.	.01	5	E
Royal White	>2.0 miles	>2.0 miles	.01	3	Build 2 150' x 10' x 6'
Ruby Group	20 ft.	20 ft.	.01	10	None
Sunshine/McWillis	0.25 mile	>5.0 mile	.25	3	E
Tetra Alpha Placer	25 ft.	25 ft.	.5	8	E
Tetra Alpha Lode & Mill	25 ft.	25 ft.	.1	1	E
Troy D	25 ft.	25 ft.	.01	8	E
Yellow Gold	>2.0 miles	>2.0 miles	.07	10	Build 3 15'x 20' x 6', 1 E
Yellow Jacket	0.25 miles	>5.0 Miles	.25	10	Private Land
Total			2.79 acres	105.7 acres	
*this is potential total area disturbed - due to operational size limits displayed in the column to the left, the entire area would not be disturbed at one time; this table does not include suction dredging					

Table 3-29 displays the distribution of mining activities across the Granite Creek watershed. As displayed in Table 3-28, the maximum area of surface disturbance in any Plan is ten acres, and no more than .25 acres of surface area may be disturbed at any time. The sub-watershed with the greatest number of suction dredge claims is in Lower Granite Creek, which has three Plans with proposed suction dredging in the 20,282 acre watershed.

Table 3-29: Distribution of Mining Activities by sub-watershed in the Granite Watershed

Subwatershed and HUC 6	Claims in subwatershed	Total Acres
Beaver Cr. 170702020203	Altona, Belvadear, Bunch Bucket, L&H, Olive Tone, Royal White, Sunshine McWillis*, Yellow Jacket*	13,077
Bull Run Cr. 170702020202	Blue Sky Bull Run*	19,399
Clear Cr. 170702020204	Grubstake, Lightning Creek*, Lucky Strike, Ruby	20,467
Lower Granite Cr. 170702020206	Blue Smoke*, East 10 Cent, Hopeful 1, Hopeful 2 & 3, Little Cross*, Rosebud, Troy D, City Limits	20,282
Upper Granite Cr. 170702020201	Eddy Shipman, Make It, Muffin, Old Eric*, Tetra Alpha Placer, Tetra Alpha Mill and Lode, Yellow Gold	9,313
* Includes suction dredging		

Analysis Framework: Statute, Regulatory Environment, and Forest Plan Consistency

Endangered Species Act

The Granite Mining BA (project file) was prepared to disclose and analyze effects of the Granite Mining Project on ESA listed species and their designated critical habitat in accordance with the following guidance and direction:

- Section 7(a)(2) of the Endangered Species Act of 1973 (as amended),
- 50 CFR § 402.12 (Interagency Cooperation, Biological Assessments),
- Endangered Species Consultation Handbook (USFWS and NMFS, 1998),
- Streamlined Consultation Procedures for Section 7 of the Endangered Species Act (FS, NMFS, BLM,& USFWS 1999)

Essential Fish Habitat

The federal Magnuson-Stevens Fishery Conservation and Management Act (§ 305(b)) and its implementing regulations (50CFR § 600) requires analysis for effects to Essential Fish Habitat (EFH) specifically for Pacific salmon. EFH includes all streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the historically accessible habitat to Pacific Salmon species. The riparian zone adjacent to these waterways is also considered EFH. This zone is defined as shade, sediment, nutrient/chemical regulation, streambank stability, and LWD/organic matter. Effects of the Granite Mining Project on EFH are described in the Biological Assessment (project file).

Water Quality

The State of Oregon Department of Environmental Quality (ODEQ) has completed Total Maximum Daily Loads (TMDLs) for the North Fork John Day Subbasin (2010) (Table 3-30). The Granite Mining Project was designed to meet all water quality regulatory requirements for the UNF and WWNF. Total Maximum Daily Load (TMDL) is the process used to address the issues of water-quality limited streams. The Forest Service has an understanding with ODEQ to cooperate in meeting State and Federal water quality rules and regulations (MOU between USDA Forest Service and Oregon Department of Environmental Quality, 2002). This MOU assigns responsibility for consistency with the TMDL to the Forest Service as the “designated management agency” on Forest Service lands. This responsibility obligates the Forest Service to participate in the TMDL process and responsibilities include a Water Quality Management Plans (WQMPs). WQMP’s for the Forest Service System lands will be written by the respective forests and approved by the Oregon Department of Environmental Quality as part of the TMDL process. Forest WQMPs rely on current laws, management plans, and the 2012 National Core Best Management Practices (BMP’s) to provide the basis for improving water quality in the forested landscape.

The 2012 National Best Management Practices (BMP’s) for water quality management on National Forest System lands enables the agency to readily document compliance with non-point source pollution control management and strategy at national or regional scales. This standardized National BMP Program is an effective tool for the agency to accomplish improved water quality to restore

impaired waters, strengthen relationships with EPA, State and the public and improve the agency's ability to use adaptive management in land management plan implementation and improve NEPA analyses and compliance with Federal laws. Lastly, the BMP Program improves the agency's ability to demonstrate results in watershed management. The National BMP program consists of four main components:

- A set of National Core BMP's for specific resource areas
- Standardized monitoring protocols to evaluate implementation and effectiveness of BMP's
- A data management and reporting structure
- Corresponding National direction.

The 2012 National BMP technical guide is located at

http://www.fs.fed.us/biology/resources/pubs/watershed/FS_National_Core_BMPs_April2012.pdf (project file).

Table 3-30: Oregon Water Quality Assessment on Streams within the Analysis area.

Stream	Temperature	Sediment	Toxins	Remarks
Clear Creek	X	Insufficient data	Insufficient data	Temp. TMDL Approved
Bull Run Creek	X	stream mile 0 to 9.3	N/A	Temp. TMDL Approved
Beaver Creek	X	N/A	N/A	Temp. TMDL Approved
Granite Creek	X	stream mile 11.2 to 16.2	Insufficient data	Temp. TMDL Approved

Regional Forester's Special Status Species List

Special Status Species (also described as Sensitive Species) are those identified by the Pacific Northwest (Region 6) Regional Forester as needing special management to meet Forest Service Manual direction, Department regulations, and National Forest Management Act obligations and requirements (USDA 2011). Special Status/Sensitive Species are species for which population viability is a concern, as evidenced by 1) current or predicted downward trends in population numbers or density; or, 2) current or predicted downward trends in habitat capability that would reduce a species' existing distribution (FSM 2670.5). The Forest Service is required to manage National Forest System lands to maintain viable populations of all native and desired nonnative wildlife, fish, and plant species (including Sensitive Species) in habitats distributed throughout their geographic range on National Forest System lands (FSM 2670.22). Forest Service activities are required to be conducted to avoid actions that may cause a species to become threatened or endangered as a result of Forest Service actions (FSM 2670.12, 2670.22).

Sensitive Species on the UNF and WWNF include those that have been documented (valid, recorded observation) or are suspected (likely to occur based on available habitat to support breeding pairs/groups) to occur within or adjacent to the UNF and WWNF boundaries. Sensitive Species included in this analysis are listed in Table 3-31.

Table 3-31: Regional Forester's Special Status Species list of aquatic invertebrate and aquatic vertebrate species present or suspected on the UNF and WWNF.

Regional Sensitive Species	Habitat Description*	Habitat Present in Analysis Area	Species Present in Analysis Area	Known Current Distribution
Western Ridged Mussel (<i>Gonidea angulata</i>)	Occur in streams of all sizes of low to mid-elevation watersheds. Common in stable stream reaches, tolerant of fine sediments and occupy depositional areas.	Yes	Present in Granite Creek and assumed present in Clear Creek.	Widely distributed west of the Continental Divide, CA to BC. It is mainly distributed east of the Cascades.
Shortface Lanx (<i>Fisherola nuttalli</i>)	Occurs in large low to mid-elevation riverine habitats. Common in unpolluted, cold, well oxygenated, perennial streams with cobble-boulder substrate.	Yes	Assumed Presence in Granite Creek.	Found throughout the Snake River, Mid-Columbia basin limited to the Upper and Lower Deschutes, Lower John Day, Upper Columbia (Okanagan R.)
Columbia clubtail (<i>Gomphus lynnae</i>)	A variety of river habitats, which can range from sandy or muddy or rocky, shallow rivers with occasional gravelly rapids. Water flow tends to be slow-moving.	Yes	Assumed Presence in parts of the Granite Watershed	Yakima River, Benton Co. John Day River, Wheeler and Grant Co. from Twickenham to Monument, Owyhee River, Malheur Co.
Westslope Cutthroat Trout (<i>Oncorhynchus clarkia lewisi</i>)	Cold high mountain streams with complex habitat	Yes	Present throughout the Granite Watershed.	Found in localized areas of the Upper North Fork John Day River subbasin including, Granite, Clear, Wolsey, Lightning, Ten Cent, Dry and Spring creeks.

*Frest and Johannes 1995, Nedeau et al. 2009, Neitzel and Frest 1990, NatureServe Explorer 2009

Affected Environment

The Granite Mining Project is an evaluation of 28 small actions (the largest is ten acres) in the 94,526 acre Granite Watershed. Tables 3-27 and 3-28 display the proximity and magnitude of activity of the individual mine claims/POOs. It is important to note that activities displayed are maximum possible disturbance. For purposes of this analysis the maximum amount of disturbance is displayed, but based on past administration of mining permits it is expected lower levels of activities would occur.

This section analyzes the direct and indirect effects of the proposed project on listed species and native fish populations. Mining activities are closely managed to reduce the potential for impacts to native, ESA listed fish and their critical habitats. This is due primarily (but not exclusively) to Best Management Practices and project-specific protection measures applied uniformly across the analysis area.

This analysis tiers to the Water Resources analysis prepared for the Granite Mining EIS, and incorporates by reference all components of the Water Resources analysis. An extensive discussion of the affected environment and effects analysis of soils, sediment and temperature can be found in the Water Resources analysis above. Site-specific analysis by each proposed Plan is also presented in the Water Resources analysis, including a discussion of RMO parameters for analysis and compliance with PACFISH Standards and Guidelines.

Descriptions of site-specific Water Resources and Fish Protection measures and other requirements are found in the Chapter 2, and Appendices 1A and 2.

Background

Placer Mining

Placer mining is the mining of stream sand, rock and gravel deposits for minerals, or discrete grains called “placers”. The metal or gemstones were moved by stream flow from an original source such as a vein. Heavy metals like gold are considerably denser than the sand, rock and gravel deposits they are found in, and they tend to accumulate at the base of placer deposits. These deposits are worked to find the precious metals. This is done by working existing surface deposits, or by various surface excavating equipment or tunneling equipment.

Although hydraulic mining is uncommon today, previously degraded habitats have not yet recovered and still exhibit excessive sediment transport, downcutting, and instability. For example, hydraulic mining (e.g., gold) from stream deposits and hillslopes dramatically altered stream channels, riparian zones, and floodplains (Spence et al 1996). Earlier hydraulic mining effects such as mounds on streambanks and abandoned ditches are still visible in the Granite Watershed.

The majority of proposed mining activities in the Granite Mining EIS are placer mining in old tailings. Some tailings have begun to recover with mature vegetation from historic mining. As described in the Plans, many sites will use heavy equipment such as backhoes and loaders to dig the material and transport to the processing equipment. Some sites will require stream fording or temporary bridges.

In areas adjacent to streams there is a potential for indirect effects from transport of sediments to streams as tailings are worked. Tailings are often composed of coarse sediment from previous

processing and sorting of rock, and sediment may be transported subsurface through the porous cobble and rock. The impacts from placer mining activities in RHCAs are limited by limits on the size of the test holes and maximum area to be worked and disturbed at one time. Test holes range in size from 20' x 10' up to ½ acre, and the maximum area disturbed at one time is ½ acre (Table 3-28). Negative effects of sedimentation and turbidity on fish and aquatics species is well established (Henley et al 2000, Michel et al 2013) and includes alteration of food chains, decreases in primary productivity, mortality or behavior modification and depressed rates of growth, reproduction and recruitment.

Mining activities may directly affect riparian areas by removing established vegetation to access tailings. Many sites have poor conditions for vegetation growth from previous disturbance and have little to no established vegetation. Vegetation next to streams provides bank stability and shade and can trap transported sediments. Vegetation next to streams also provides organic inputs to streams with inputs of large and small wood, and is a source of food for fish if insects fall into streams. Fish and aquatic resources are indirectly affected by loss of riparian vegetation because of potential negative effects to bank stability, loss of shade, increased sedimentation and turbidity and loss of organic material.

Suction Dredging

Suction dredge mining directly affects fish and their habitat. Although only seven Plans include suction dredging, the potentially greater impact to ESA listed species and their DCH warrants a separate discussion of suction dredging. Sediment delivery suction dredging can substantially exceed the natural level and amounts of sediment deposited and turbidity can be excessive. Excessive fine sediment on the stream bottom eliminates habitat for aquatic organisms such as insects and mollusks, reducing density and biomass (Harvey and Lisle 1986) and reduces the permeability of spawning gravels and can block the interchange of subsurface and surface flows. Excavation by dredging in particular causes significant local changes in channel topography, and this varies with stream size and flow. Dredging can artificially deepen the channel along streambanks and the roughness of streambanks and the adjacent bed (removal of large rocks roots and bank projections) is reduced. Waste material from placer and dredging operations may occupy as much as 20% more volume after it is dredged, is difficult to dispose of, and is often deposited adjacent to streams, forming extremely unstable stream banks.

Smaller channels would be expected to endure greater impacts given limited spawning habitat and a greater portion of stream bed would be disturbed. Dredging impacts vary in large streams, given disturbance is limited to less than 25 cubic yards per operation of wetted stream, and an operation can occupy approximately 0.5 to 1.0 stream miles. Typically, dredgers excavate 3 feet to reach bedrock, equating to a disturbed area of approximately 225 square feet. In a small stream, this area may include high value spawning gravels and action could potentially result in lost production (OAFS 2013).

Dredging near riffle crests can also pose issues for channel stability. Dredging causes riffle crests to erode, spawning sites may be destabilized (Harvey and Lisle 1999), and upstream pools may become shallower. Mine tailings may increase the availability of spawning sites in streams that lacking spawning gravel. However, if tailings are unstable, consequences of dredging could be negative for spawning adults. Increasing the crest can deflect water flow to one side of the channel promoting bank erosion, and scour. This effect can be exacerbated year after year (Harvey and Lisle 1998). Miners commonly pile rocks too large to pass through dredges and can persist through high flows; however, piles of cobbles probably have only minor, local effects on aquatic organisms.

In some locations there may be temporary improvement of fish habitat. Pools can be temporarily formed to deepen by dredging and deep scour may intersect subsurface flow and create pockets of cool water during summer. However, most of these “habitat improvements” tend to be short lived because they tend to be filled with sediment during high flows (Thomas 1985). It is important to note that a single dredge operation cannot mobilize a significant volume of fine sediment compared with the volume mobilized during high seasonal discharge. However, these impacts are more deleterious with temporal and spatial overlap of dredging operations and juvenile fish are occupying habitat in the summer, where they are mostly absent during the spring due to these high flows.

There are also many potential indirect effects to fisheries associated with dredging including impaired feeding activity, decreased scope of activity, reduced growth rates, downstream displacement and decreased resistance to other environmental stressors (Harvey 1986, McLeay et al. 1986). Behavioral responses of stream biota to noises and vibrations generated by dredging have not been quantified but studies suggest they are inconsequential to juvenile fish (Thomas 1985, Somer and Hassler 1992). However, even minor disturbances during the summer may harm adult anadromous fish due to limited energy supply and near lethal stream temperatures (Harvey and Lisle 1998). State regulations limit dredging to summer months but, dredging can still overlap with fish spawning and incubation of embryos. In some streams, such as ones located in the Upper Granite Watershed, salmonids do not emerge from the substrate until summer, and many non-salmonids have protracted spawning periods extended into summer. Many juvenile and adult fishes are likely to avoid or survive passage through a suction dredge (Harvey and Lisle 1998, Nelson et al. 1991).

The effects of toxic metals in small placer and dredge operations is more difficult to analyze because metals are naturally present in varying concentrations in all surface waters, and many are required by fish in trace quantities. In particular, mercury is highly potent neurotoxin that impacts the function and development of the central nervous system in most aquatic organisms. When mobilized from substrates, mercury is more easily converted to a form that moves through the food chain (ORAFS 2013). High concentrations of mercury can be found in streambed sediments in areas with past history of intensive placer and cinnabar mining such as Northeastern Oregon. Mercury is often buried at depths not normally disturbed by floods, however, suction dredging can exhume deeply buried mercury and if not deposited in the dredge sluice box and removed by miners, this mercury is easily mobilized. (Marvin-Di Pasquale et al. 2011). There are currently no streams within the Granite Watershed that are ODEQ 303d listed for mercury contaminants above state or federal regulatory standards.

Project-Specific Protection Measures, General Requirements and Best Management Practices

When Forest Service Site-Specific Water Resources Protection Measures (Appendix 1A), General Requirements (Appendix 2), Site-Specific Fish Protection Measures (Chapter 2) and the 2012 Best Management Practices (project file) are followed, placer mining and suction dredge mining are predicted to have localized and short-term direct and indirect effects and impacts to fisheries and other aquatic organisms and aquatic habitat. However, even with the adherence of these measures suction dredge mining activities can lower survival of eggs and early life stages of fishes that use tailings as spawning substrate, detrimentally alter substrates, and mobilize toxic heavy metals. This impact is dependent on size of the stream, a streams hydrologic regime, streams with limited spawning habitat and streams inhabited by ESA-listed and sensitive species.

Given the existing conditions of most subwatersheds within the Granite Analysis area, suction dredging and some placer mining in and adjacent to Granite and Clear Creeks could negatively affect

ESA-listed and sensitive fish species and other aquatic organisms. Mechanisms for these effects are summarized below:

Direct Effects

- Disturbance to fish from fording
- Sedimentation from disturbed stream adjacent areas from fording (limited by rocking streambanks and other Protection Measures)
- Suction dredging affecting fish by impaired feeding, displacement etc (limited by requirements in State Permits)
- Effects to fish habitat, sedimentation and channel stability from suction dredging
- Mobilized toxic metals from suction dredging

Indirect Effects

- Sediment from disturbed adjacent riparian areas (areas of mining or processing) could be transported to stream channels
- Small quantities of fuels and lubricants could be transported to stream channels
- Loss of riparian vegetation could affect bank stability, shade and insects and leaf inputs from trees and shrubs inputs in some areas

Forest Service Requirements and Protection Measures are predicted to reduce the potential for indirect effects to an insignificant and non-measurable amount. Direct effects are limited by the small magnitude of some of the activities distributed across the Granite Creek watershed (such as a limited number of fords and stream crossings or trips during the operating season). Direct effects from suction dredging are limited by a potential of only seven Plans in the Granite Creek watershed, and limits set by the State of Oregon.

Lode Mining

The type of mineral mined in lode operations influences the extraction method, processing techniques, and thereby the environmental impacts. As mentioned above, proposed lode mining in the Granite Mining project area is strictly maintenance and re-opening of existing adits. These operations are only proposing extraction of minerals mechanically with heavy equipment. Operations are not extracting deposits using “solution mining”, which, involves a chemical solvent that is pumped underground with resulting ore solution pumped to the surface for recovery. The main environmental concerns with lode operations in the Granite Mining project are toxic chemicals leached from existing mine tailings or overburden. This overburden can contain toxic metals such as arsenic, chromium, copper, lead, mercury and zinc. Pollution of streams by this acid mine drainage is generally considered to be the most serious water pollution aspect of mining operations. Acid waste is problematic because pyrite readily oxidizes in water to form sulfuric acid when it is exposed to atmospheric oxygen. Given proximity to certain streams, effluent waters under these conditions may have low pH, which is directly toxic to most forms of aquatic life (Nelson et al. 1991). This discharge is most often observed in underground mining operations, surface runoff from overburden or tailings piles, and leakage from settling ponds.

BMP's and additional specific protection measures for lode mines in this project (General Requirements L1-L11) are in place to prevent seepage or toxic effluent discharge into streams from any overburden produced from lode mine operations. Engineering Evaluation and Cost Assessment

on abandoned mines on federal and private lands, also outline reclamation options with specific mitigations. These mitigations include prevention of acid waste discharge.

Connected Actions

Secondary activities associated with mining, such as the creation of access roads and the generation of solid wastes, contribute to long-term environmental impacts before, during, and after mining operations. Mining sites could be occupied for long periods of time with camping in riparian areas, where camps can be difficult to properly maintain. Annual inspections and implementation and effectiveness monitoring, and the General Requirements H1-H12 (Appendix 2) address these concerns. Table 4 outlines the existing structures within the RHCA's. Disturbed areas could be colonized by invasive plant species (see Invasive Plant EIS for the WWNF and the UNF 2011). Any newly established invasive plants would be treated through the Early Detection Rapid Response process in the Invasive Plants EIS.

Several of these mine operations have proposed stream fords that would be utilized in and outside of the instream work window (July 15th-August 15th), on open public and closed roads. These stream crossings can have direct and indirect effects to fisheries. Crossing of the fords with heavy machinery can modify fish behavior, movement and feeding behavior. The majority of these crossings are on existing fords with only one new proposed ford crossing. General Requirements Z1-Z14 (Appendix 2) address indirect effects from the construction of these ford crossings, and under the action alternatives, several of these operations would be required to receive an ODEQ 401 certification before the Forest Service will authorize construction or improvements of temporary roads and associated fords. The majority of ford improvements would have short term effects associated with the hardening of fords. Site-specific protection measures for these operations would have conditioned ford crossings with heavy machinery to minimize direct effects to fisheries. Existing road conditions and any proposed temporary road activities are found in Chapter 2 and the project file.

Reclamation

Surface mining operations can involve varying degrees of alteration of vegetation, soils, and subsurface materials, with accompanying changes in surface and subsurface hydrology. Whether these effects will be temporary or long-term depends on reclamation techniques and site location. The hydrologic character of surface-mined lands and reclamation potential is determined by several variables, including precipitation, solar input, slope steepness, vegetation types and composition, and characteristics of the spoils or overburden (Nelson et al. 1991). Reclamation of mined areas is an integral part of mining operations. The Surface Mining Control and Reclamation Act (SMCRA 1977) supplements state regulations, requires restoration of mined land to pre-mining condition and prohibits mining where mandated restoration would not be possible. SMCRA specifically calls for the restoration and, if possible, enhancement of fish and wildlife habitat, which, coincides with requirements of both the Multiple-Use Sustained Yield and Federal Land Policy and Management Acts.

Rehabilitation and reclamation processes for the Granite Mining Operations are part of the planning process. Requirements highlighting ongoing and final reclamation are found in Appendix 2, General Requirements R1 – R 18.

In addition, restoration efforts are ongoing in the Granite and Bull Run Creek Watersheds. Watershed Restoration Action Plans (WRAPS) have been established for both of these watersheds to improve

stream function, address legacy effects of past mining and remove artificial barriers for fish passage. WRAPs prioritize projects such as aquatic organism passage projects, road decommissioning, riparian planting, stream reconnection, evaluation of water rights and uses, maintenance of pipe systems of mine operations under CERCLA, and identification and removal of CERCLA actions. The Clear Creek and Bull Run Watershed Restoration Action Plans can be found at <http://apps.fs.usda.gov/WCFmapviewer/>.

Environmental Effects

Specific Methodology and Assumptions

To reduce duplication, this BE incorporates by reference the Fisheries Biological Assessment (BA) prepared for ESA Section 7 consultation. For a full description of methodology and existing conditions refer to the Fisheries BA in the project file. The environmental baseline discussion and discussion of effects is based on FS habitat stream survey data, ODFW stream survey data, as well as GIS analysis. Water temperature data is referenced from the UNF and WWNF monitoring records. The seven-day moving maximum and average summer time water temperatures are measured. Stream surveys follow the Region 6 level II stream survey protocol (following a modified Hankin and Reeves 1988 protocol).

Alternative 1 – No Action Alternative

Direct and Indirect Effects

Under Alternative 1 of the Granite Mining Project, the Forest Service would not change management in the project area; there would be no proposed mining or connected mining activities. Therefore, there would be no mechanism for direct and indirect effects to ESA listed fish species and their DCH, MIS, and USFS R6 sensitive fish and aquatic invertebrates and their critical habitat from the proposed activities.

The existing condition as described in the Affected Environment section above would continue as previously approved mining operations and associated reclamation activities are completed. Until all previously approved activities are completed, impacts to ESA listed fish species and their DCH or FS R6 sensitive fish and aquatic invertebrates and their critical habitat would continue as described in the Affected Environment section.

Alternative 2 – Miner's Proposed Plan of Operation

Direct and Indirect Effects of Miner's Proposed Plan of Operation

Table 3-32 below determines the risk of effects and examines the direct and indirect effects to fisheries using the matrix indicators or habitat components and Riparian Management Objectives that would be potentially affected by mining activities and connected actions proposed under Alternative 2. Refer to Table 3-34 for reasons for including specific aquatic habitat parameters in this evaluation. Under Alternative 2, any mitigation measures and water resource protection measures are only those proposed in the Plan of Operation. These can be referenced in Appendix 1A which also includes further analysis on water quality impacts concerning surface and subsurface sediment discharge.

Table 3-32: Determination of risk of adverse effects (high, moderate, low) to native fish populations in the Granite SWS from proposed mining activities Alternative 2²

L=No questionable adverse effects on habitat. The action is controlled by seasonal or spatial restrictions and is not likely to adversely affect habitat.

M= A moderate rating assumes potential adverse effects on habitat. The action is not completely controllable, and administration of the action is needed to prevent adverse effects on habitat.

H= A high rating assumes possible adverse effects on habitat. The action is not completely controllable, and intense administration of the activity is needed. Adverse effects on the habitat are likely to occur.

Mine Claim and Rationale	Direct Effects to Fish	Risk of Direct/Indirect Effects to Each Matrix Indicator (reach scale)										
		Temp	Sedi ment	Chemical Contamina tion	LWM	Refuge	Off-Channel	Bank Stability	Flood Plain	Road Access	Flow Disturbance	RHCA Disturbance
Altona	L	L	L	H	L	L	L	L	L	L	L	L
	Proposed operation does not have a method or mitigation to for containment of adit waste rock.											
Belvadear	L	M	H	L	L	L	L	L	L	M	M	M
	Proposed operation does not have a method or mitigation to prevent sediment discharge. RHCA disturbance due to removal of vegetation and temp road access.											
L&H	M	L	H	H	L	L	L	L	L	L	L	L
	Proposed operation does not have a method or mitigation to prevent sediment discharge or mitigation for containment of adit waste rock.											
Olive Tone	M	H	M	L	L	L	L	L	L	L	M	L
	Indirect temperature effects due to water withdrawal and potential direct effects due to stream crossings on Olive Creek.											
Royal White	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams											
Sunshine /McWillis	L	L	M	L	L	L	L	L	L	L	L	L
	Proposed operation does not have a method or mitigation to prevent sediment discharge											
Yellow Jacket	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams											
City Limits	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams.											
Eddy Shipman	H	L	H	M	L	L	L	L	L	M	L	H
	Proposed operation does not have a method or mitigation to prevent sediment discharge or mitigation for containment of adit waste rock. Indirect effects due to proposed stream crossing and road use.											
Make It	L	M	L	L	L	L	M	L	L	L	M	L
	Temperature and flow disturbance concerns with use of the reservoir.											
Muffin	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams.											
Old Eric 1&2	H	M	H	L	L	L	L	L	L	L	L	L
	Direct effects to fish due to suction dredging, and temperature concerns associated with overflow from settling pond.											
Yellow Gold	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams.											

² Mitigations measures are only those proposed in the Miner's Proposed Plan of Operation, see project description. Reference Appendix 1A for further analysis on Water Resource impacts to applicable matrix indicators.

Tetra Alpha Placer	H	L	H	L	L	M	L	H	H	H	L	H
	Proposed operation does not have a method or mitigation to prevent sediment discharge. Direct effects due to proposed stream crossing and road use. Disturbance to RHCA from temporary road construction.											
Tetra Alpha Lode & Mille	M	M	L	L	L	L	L	L	L	L	L	L
	Temperature concerns due to water withdrawals.											
Blue Sky-Bull Run	H	L	H	L	L	M	M	M	M	M	L	M
	Proposed operation does not have a method or mitigation to prevent sediment discharge. Direct effects due to proposed stream crossing and road use. Disturbance to RHCA given temp road construction. Direct effect to fish due to suction dredging.											
Bunch Bucket	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams.											
Grubsteak	L	L	M	L	L	L	L	L	L	L	L	L
	Proposed operation does not have a method or mitigation to prevent sediment discharge.											
Lightning Creek	H	L	H	L	L	L	L	M	L	L	L	L
	Direct effects to fish due to suction dredging.											
Lucky Strike	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams.											
Ruby Group	M	L	H	L	L	L	L	L	L	H	L	L
	Proposed operation does not have a method or mitigation to prevent sediment discharge. Direct effects to fish associated with stream crossing.											
Blue Smoke	H	L	H	L	L	L	L	L	L	L	L	L
	Direct effects to fish associated with suction dredging.											
East Ten Cent	L	L	M	L	L	L	L	M	M	M	L	L
	Proposed operation does not have a method or mitigation to prevent sediment discharge. Disturbance to RHCA with road construction and use.											
Hopeful I	L	L	L	L	L	L	L	L	L	L	L	L
	Distance of mining activity from Granite Creek and local topography											
Hopeful 2&3	H	L	M	M	L	L	L	M	L	M	L	M
	Proposed operation does not have a method or mitigation to prevent sediment discharge. Direct concerns with stream fording.											
Little Cross	H	L	M	L	L	L	L	L	L	L	L	L
	Potential direct effects to fish due to suction dredging activity.											
Rose Bud 1-4	L	L	M	L	L	L	L	L	L	L	L	L
Troy D	L	L	M	L	L	L	L	L	L	L	L	L
	Proposed operation does not have a method or mitigation to prevent sediment discharge.											

Alternative 3 – Miner's Proposed Plan of Operation with Forest Service Requirements

Direct and Indirect Effects of Miner's Proposed Plan of Operation with Forest Service Requirements

Table 3-33 below examines the direct and indirect effects to fisheries using the matrix indicators or habitat components and Riparian Management Objectives that would be potentially affected by mining activities and connected actions with Forest Service General Requirements (Appendix 2), Site-Specific Water Resource Protection Measures (Appendix 1A) and Fish Protection Measures

(Chapter 2) proposed under Alternative 3. Refer to Table 3-35 for reasons for including specific aquatic habitat parameters in this evaluation.

Table 3-33: Determination of risk (high, moderate, low) to native fish populations in the Granite SWS from proposed mining activities in Alternative 3.

Mine Claim and Rationale	Direct Effects to Fish	Risk of Indirect/Direct Effects to Each Matrix Indicator (evaluated at the reach scale)										
		Temp	Sediment	Chemical Contamination	LWM	Refuge	Off-Channel	Bank Stability	Flood Plain	Road Access	Flow Disturbance	RHCA Disturbance
Altona	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements											
Belvadear	L	M	H	L	L	L	L	L	L	M	M	M
	General Requirements											
L&H	L	L	H	M	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (stream crossing 2-4 times)											
Olive Tone	L	H	L	L	L	L	L	L	L	L	M	L
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (stream crossing 2-4 times)											
Royal White	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements											
Sunshine /McWillis	L	L	M	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (stream crossing 2-4 times).											
Yellow Jacket	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements											
City Limits	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements											
Eddy Shipman	M	L	M	L	L	L	L	L	L	M	L	H
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (stream crossing 2-4 times).											
Make It	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures.											
Muffin	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements											
Old Eric 1&2	H	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures. Direct effect to fish due to suction dredging.											
Yellow Gold	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements											
Tetra Alpha Placer	H	L	H	L	L	M	L	L	M	M	L	H
	General Requirements, Site Specific Protection Measures.											
Tetra Alpha Lode & Mill	L	M	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures, potential temperature concerns due to water withdrawals.											
Blue Sky-Bull Run	H	L	H	L	L	M	M	M	M	M	L	M
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (stream crossing 2-4 times). Direct effect to fish due to suction dredging.											
Bunch Bucket	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements.											
Grubsteak	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures.											
Lightning Creek	H	L	L	L	L	L	L	L	L	L	L	L

Mine Claim and Rationale	Direct Effects to Fish	Risk of Indirect/Direct Effects to Each Matrix Indicator (evaluated at the reach scale)										
		Temp	Sediment	Chemical Contamination	LWM	Refuge	Off-Channel	Bank Stability	Flood Plain	Road Access	Flow Disturbance	RHCA Disturbance
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (stream crossing 2-4 times). Direct effect to fish due to suction dredging.											
Lucky Strike	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements.											
Ruby Group	M	L	M	L	L	L	L	L	L	M	L	L
	General Requirements, Site Specific Protection Measures.											
Blue Smoke	H	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures. Direct effect to fish due to suction dredging.											
East Ten Cent	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures.											
Hopeful I	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures.											
Hopeful 2&3	H	L	M	M	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (stream crossing 2-4 times).											
Little Cross	H	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures. Direct effect to fish due to suction dredging.											
Rose Bud 1-4	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures											
Troy D	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures											

Cumulative Effects common to Alternatives 2 and 3

Existing Mines within the Granite Watershed

It is estimated that over 100 historic and/or abandoned mines exist in the Granite Creek Watershed. These past and ongoing mining activities on state, federal and private lands have greatly impacted or have the potential to impact water resources and fish habitat throughout the Granite Watershed. Inventory and assessment of these mines is an ongoing project for the UNF and WWNF. For a more extensive description of inventories and reclamation plans see the hydrology report.

For additional information on historic and abandoned sites visit the Forest Service National web page at <http://www.fs.usda.gov/detail/umatilla/landmanagement/planning/?cid=stelprdb5208004> for the Umatilla NF, and <http://www.fs.usda.gov/detail/wallowa-whitman/landmanagement/projects/?cid=stelprdb5287229> for the Wallowa Whitman NF (not all sites listed on these web pages are within the Granite watershed).

Past, present and future activities that may affect native fish populations and their habitat and sensitive aquatic invertebrates and overlap in time and space are discussed in this cumulative effects analysis and displayed in Table 3-34. Complete discussion of the past, current and future activities in the Granite Watershed can be found at the beginning of Chapter 3 of the EIS.

Table 3-34: Past, Present and Reasonably Foreseeable Actions within the Analysis area**P = Past, O = Ongoing, F = Future**

Past, Ongoing, or Future Project	Name of Project and Forest	Overlap (yes or no)		Notes
		In Time	In Space	
P	Central Mine	yes	yes	Central Mine has an adit that overlaps with Eddy Shipman. There is a potential for activities in the Eddy Shipman mine to disturb materials in the Central Mine adit. Proposed operation does not have a method or mitigation to prevent sediment discharge into stream and placement of adit waste. The EE/CA of Central mine states that metal concentrations are near clean-up level but specific on-site containment has yet to be provided.
Conclusion: Actions in the Eddy Shipman mine may overlap with residual effects from historic activities in the Central Mine, potentially incrementally increasing the effects of the Eddy Shipman activities.				
P	New York Independence and East Eddy	yes	yes	New York Independence and East Eddy Mine have an adit that overlaps with Eddy Shipman. There is a potential for activities in the Eddy Shipman mine to disturb materials in the shared adit. Proposed operation does not have a method or mitigation to prevent sediment discharge into stream and placement of adit waste. A site investigation in 1996 found elevated metals in waste rock and tailings and soil, however claims were placed on Confirmed release list in 2004.
Conclusion: Actions in the Eddy Shipman mine may overlap with residual effects from historic activities in the New York Independence and East Eddy Mine Mine, potentially incrementally increasing the effects of the Eddy Shipman activities.				
P	Culvert replacements and restoration projects included in Granite, Clear Creek and Bull Run River Watershed Action Plans WWNF and UNF	yes	yes	Includes Clear Creek Watershed Restoration Action Plan (WRAP) and Bull Run River WRAP for potential restoration needs and projects. Common actions include fish barrier culvert replacements, riparian plantings, restoration of disturbed sites, improving existing roads and reducing sediment from roads.
Conclusion: Actions in a WRAP could increase sediment production and turbidity in streams for the short term (up to 2 weeks). Based on previously completed actions, or similar actions in adjacent watersheds, increases should be localized to the site of the action, and effects would occur at the reach scale. These actions could occur near mining activities. Overall risks to aquatic resources are low and benefits are high.				
F	Granite Multiple Culvert Replacement WWNF	yes	yes	This project proposes to remove and replace 7 culverts with fish passage friendly structures throughout the area around the town of Granite, OR. Projected implementation summer 2015. Projects could temporarily (up to 2 weeks) affect access as culverts are replaced.

Past, Ongoing, or Future Project	Name of Project and Forest	Overlap (yes or no)		Notes
		In Time	In Space	
Conclusion: Culvert replacements could temporarily increase sediment production and turbidity in streams (up to 2 weeks). Based on previously completed actions, or similar actions in adjacent watersheds, increases should be localized to the site of the action, and effects would occur at the reach scale. These actions could occur near mining activities. Overall risks to aquatic resources are low and benefits are high.				
P	Storm Damage Risk Reduction UNF	yes	yes	SDRR – (Storm Damage Risk Reduction). Culvert replacement and other drainage improvements on the 1035 1038, and the 7335 road systems. (Fortifying road edges, planting trees and shrubs, improving ditch lines and drainage dips, and restoring unusable roads beds to forested land.)
Conclusion: These activities occurred near the East 10 Cent mine. As activities weather, risk of sedimentation decreases. Overall risks to aquatic resources are low.				
P, O	Road use and Road Maintenance WWNF & UNF	yes	yes	<p>The analysis area has an extensive Forest Service road system that was built during the period of large-scale logging which took place in the 1960s and 1970s</p> <p>Road maintenance is an ongoing activity. The main gravel roads receive surface maintenance usually once a year. On about a 5-year schedule, all other roads get inspected for deferred maintenance. Dependent on funding, problems identified during inspections are taken care of within the year.</p>
Conclusion: Funding for road maintenance is at low levels, individual actions such as blading can generate road surface sediment, and the scale is small due to limited actions. Overall risks to aquatic resources are low.				
P, O	Fire, Fuels Reduction and Timber Harvest WWNF & UNF	yes	yes	<p>Greenhorn Thinning (ongoing) and Granite Interface (past – 2004)</p> <p>Granite WUI – Ten Cent fuels area – Blue Mtn Forests fuels reduction project:</p> <p>This work may include; Road and trail maintenance or obliteration to restore or maintain water quality, soil productivity, habitat for wildlife and fisheries, or other resource values, setting of prescribed fires to improve the composition, structure, condition and health of stands or improve wildlife habitat, removing vegetation or other activities to promote healthy forests, reduce fire hazards, or achieve other land management objectives, watershed restoration and maintenance, restoration and maintenance of wildlife and fish habitat, control of noxious weeds and exotic weeds, and re-establishment of native plant species.</p> <p><i>Projects could occur near Granite Mining activities.</i></p>
Conclusion: Road maintenance such as blading can generate road surface sediment, but the scale is small due to limited actions. BMPs included in fuels projects protect water quality and riparian vegetation. Overall risks to aquatic resources are low.				
O	Long-term Special Use Permits WWNF & UNF	yes	yes	Currently, there are only a few lands related Special Uses in the Granite watershed area. These consist of power, electrical and water transmission lines to the local communities and residences of the area.
Conclusion: Possible cumulative effects would be from roads used access to facilities on private, poorly maintained roads. If these roads require maintenance this could generate sediments; but due to the low number of facilities and associated roads sediment inputs would be small.				

Past, Ongoing, or Future Project	Name of Project and Forest	Overlap (yes or no)		Notes
		In Time	In Space	
O	OHV use WWNF & UNF	yes	yes	<p>On the WWNF, with the exception of the North Face Vehicle Closure, the entire area is open to motorized travel including off-road travel. All maintenance level 1 roads (closed roads) are open to off-road vehicles.</p> <p>On the Umatilla NF, there are no designated OHV (Off Highway Vehicle) trails in the area. However, OHV activity is permitted and does occur on open roads in the analysis area. This includes riding motorcycles (Class III) and four-wheelers (Class I) on these roads. With the exception of Forest Service Road 10, all open roads within the analysis area are open to OHV travel, per the 2001 Interim Program for ATV/OHV Strategy on the Umatilla National Forest (UNF). Additionally, the 1000460, 1000520, 1010370, 1035060, 1035080, 1038060, 7350050, 7350052 and 7350070 are forest system roads open seasonally to OHV use but closed to other motorized trails. Note that State law does not allow ATV use on two lane roads. All double digit roads 73, 10 etc are considered two lane roads and not useable to ATV's unless they are highway certified.</p>
<p>Conclusion: Cross county OHV travel on the WWNF could result in stream fording, which may disturb fish or other aquatic species. If fording occurs at sites that are not hardened sedimentation could occur. As stated in the Recreation section of this chapter, most of the observed OHV travel within the area is associated with hunting. Hunting season begins in the late summer early fall. At that time mining operations began to shut down due to lack of water. Because of the low use by OHV's in this area, overall risks to aquatic resources are low.</p>				
P, O, F	Redboy Mine, Blue Bird and Black Jack Restoration Improvements - NFJD Watershed Council WWNF and UNF	yes	yes	<p>Ongoing maintenance and repair of the pipeline and settling ponds. In 2013 the piping system to move the water from the adit to the settling ponds was upgraded and replaced.</p> <p>The EE/CA completed by Cascade Earth Systems found that arsenic concentrations on lower Clear Creek are slightly above Oregon DEQ criteria for toxic pollutants. Other dissolved metal concentrations in surface water were below the minimum detection level (MDL) of 50µg/L. Sediment concentrations of arsenic are above the EPA Threshold Effect Levels. Sediment concentrations of copper, cadmium, manganese, nickel and zinc are also in excess of state and/or federal comparison criteria. The Clear Cr. WRAPs addresses essential project work for ongoing water quality monitoring.</p> <p>Blue Bird and Black Jack Mines - Annual maintenance on the outlet pipes and the settling ponds for the acid drainage from the adits.</p> <p>Additional evaluations are needed at Redboy Mine and the site was placed on Confirmed release list in 2003.</p>
<p>Conclusion: There is a low probability release of mineral placer materials from Granite Mining activities could incrementally add to the effects of the Redboy Mine Restoration Improvements. Any cumulative effect would be minor and not measureable.</p>				

Forest Plan Consistency

Applicable PACFISH Standards and Guidelines for Minerals Management:

MM-1

If the Notice of Intent indicates a mineral operation would be located in a Riparian Habitat Conservation Area, or could affect attainment of Riparian Management Objectives, or adversely affect listed anadromous/inland fish, require a reclamation plan, an approved Plan of Operations, and reclamation bond. Such plans and bonds must address costs of removing facilities, equipment and materials; recontouring disturbed areas; isolating and neutralizing toxic material; salvage and replacement of topsoil; and revegetation of RHCAs. Reclamation bonds must contain measurable attainment and bond release criteria for each reclamation activity.

MM-2

Where no alternative to siting facilities in RHCAs exist, locate and construct the facilities in ways that avoid impact to RHCAs and adverse effects. Where no alternative to road construction exists, keep roads to the minimum necessary for the approved mineral activity. Close obliterate and revegetate roads no longer required for mineral or land management activities.

MM-3

If no alternative to locating mine waste facilities in RHCAs exists, and releases can be prevented and stability can be ensured, then:

- Analyze the waste material using current sampling methods
- Locate and ensure mass stability and prevent the release of acid or toxic materials.
- Reclaim and monitor waste facilities to assure chemical and physical stability and vegetation.
- Require adequate reclamation bonds to ensure long term chemical and physical stability

MM-6

Develop inspection, monitoring, and reporting requirements for mineral activities. Evaluate and apply the results of inspection and monitoring to modify mineral plans as needed to eliminate impacts that prevent attainment of RMOs and avoid adverse effects to list listed fish.

There are three major components to the Granite Mining project: actual mining activity (lode, suction dredge and placer), road activities/maintenance, and other connected actions such as camping, water diversion and reclamation. Each of these types of activities carries potential for effects to some components of aquatic habitat. Only those habitat components potentially affected by these types of activities or that are specifically addressed as PACFISH Riparian Management Objectives (RMOs) will be addressed in this analysis. Table 3-35 summarizes reasons for including individual aquatic habitat components in this evaluation.

Table 3-35: Listing of Aquatic Habitat Components found in the Granite Effects Analysis.

Habitat Component	PACFISH RMO	Activities Potentially Affecting Habitat		
		Mining	Road Construction/Improvement	Other Connected Activities
Pool frequency/Quality	X	X	X	
Water quality				

Temperature	X	X	X	X
Suspended sediment		X	X	X
Chemical contamination		X	X	X
Large woody debris	X	X	X	
Stream Channel conditions				
Bank stability	X*	X	X	
Substrate		X	X	
Flow regime				
Flow timing		X	X	X
Flow volume		X	X	X
Road density and location	Not a habitat parameter. Included because it could affect habitat quality			
Disturbance history regime	Not a habitat parameter. Included because it could affect habitat quality			
*RMOs of bank stability and lower bank angle are applicable only in non-forested systems				

Some of these habitat components are specifically addressed as PACFISH RMOs (Section 7 Fish Habitat Monitoring Protocol for the Upper Columbia River Basin, USDA Forest Service 1994), and are summarized in Table 3-36. These objectives are part of determining the complexity of habitat available for fish within the analysis area.

Table 3-36: PACFISH RMO's applicable to the project area (UNF and WWNF Forest Plans as amended by PACFISH 1995)

Habitat Feature	RMO's									
Pool Frequency (see paragraph below Table 12)	Wetted width (feet)	10	20	25	50	75	100	125	150	200
	Number pools/mile	96	56	47	26	23	18	14	12	9
Water Temperature	Compliance with Water Quality standard or maximum Temp. <68 °F									
Large Woody Debris	> 20 pieces/mile, >12 inch diameter, >35 ft. length									
Width/Depth Ration	<10, mean wetted width divided by mean depth									

Under the Section 7 Habitat Monitoring Protocol for the Upper Columbia River Basin (USDA 1994), PACFISH RMO's are intended to apply to Rosgen (1996) C-type channels (McKinney et al 1996). Additional habitat parameters that are important for determining complex aquatic habitat and considered in this analysis include substrate embeddedness/percent fines, habitat accessibility, off channel habitat and refugia, floodplain connectivity, streambank condition, road density and location (measured as mi/mi^2 and percent drainage network increase), and past disturbance to riparian conservation areas.

Alternatives 1 and 3

Alternatives 1 and 3 are consistent with Forest Plan direction regarding native fish populations. None of the potential direct/indirect/cumulative effects are expected to adversely affect PACFISH Riparian Management Objectives (RMOs), prevent attainment of RMOs, or steelhead/rainbow trout population viability. Application of PACFISH direction would maintain fish habitat conditions in the analysis area per applicable PACFISH Minerals Management standards and guidelines. Forest Service General Requirements (Appendix 2) and Site Specific Water Resource Protection Measures (Appendix 1A) and Fish Protection Measures (Chapter 2) incorporated into Alternative 3 reduce potential effects as described above in *Direct and Indirect Effects*.

Alternative 2

Alternative 2 meets the purpose and need under 36 CFR 228.4 and 228.5 but does not meet several PACFISH Mining Standards and Guidelines (Table 3-37).

This page intentionally left blank

Table 3-37: Compliance with mining PACFISH Standards and Guidelines under Alternative 2. See above for a description of applicable PACFISH Mining standards and guidelines.

Plan of Operation	PACFISH Compliance under Alternative 2				Rationale
	MM-1	MM-2	MM-3	MM-6	
Altona	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
Belvadear	No	No	No	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. newly constructed temp roads and removal of riparian vegetation. There is no proposed method to ensure stability of waste rock and sediment discharge from settling ponds into stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Blue Smoke	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's and applicable state permits.
Blue Sky/Bull Run	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. newly constructed temporary roads and instream activity. There is no proposed conventional method to prevent sediment discharge into stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Bunch Bucket	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
City Limits	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
East Ten Cent	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. newly constructed temp roads and haul within the RHCA. There is no proposed method to prevent sediment discharge into stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Eddy Shipman	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. newly constructed temporary roads and haul within the RHCA. There is no proposed method to prevent sediment discharge into stream and placement of adit waste. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Grubsteak	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. newly constructed temp road with stream crossing. There is no proposed method to prevent sediment discharge into stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Hopeful 1	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's

Plan of Operation	PACFISH Compliance under Alternative 2				Rationale
Hopeful 2 & 3	No	No	No	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. use of existing roads with stream crossings. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
L&H Placer	No	Yes	No	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's. There is no proposed method to ensure the stability of waste rock and adit waste discharge into the stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Lightning Creek	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's and state permits.
Little Cross I	No	No	Yes	No	There is no proposed method to ensure the stability of waste rock and subsurface sediment discharge into the stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Lucky Strike	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
Make It	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's. There is no proposed method to address temperature concerns. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Muffin	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
Old Eric 1&2	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's. There is no proposed method to address temperature concerns via subsurface flow from settling pond. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Olive Tone	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's. There is no proposed method to address temperature and sediment concerns. There is no proposed adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Rose Bud	No	Yes	Yes	No	There is no proposed method to prevent sediment discharge into stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Royal White	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
Ruby Group	No	Yes	Yes	No	There is no proposed method to prevent sediment discharge into the stream given the season of use on a closed road to several sites and proposed stream fords. There is no proposed adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Sunshine/McWillis	No	No	Yes	No	There is no proposed method to prevent sediment discharge into stream. There is no proposed adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Tetra Alpha (Placer)	No	No	No	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. newly constructed temp roads, and constructed fords. There is no

Plan of Operation	PACFISH Compliance under Alternative 2				Rationale
					proposed method to prevent sediment discharge into stream. There is no proposed adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Tetra Alpha (Mill & Lode)	No	No	No	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's from use of settling ponds. There is no proposed method to prevent heavy metal discharge into the stream. There is no proposed adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Troy D	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's. There is no proposed method to prevent subsurface sediment discharge from settling ponds into the stream. There is no proposed adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Yellow Gold	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
Yellow Jacket	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's

This page intentionally left blank.

Summary of Determination of Effects Analysis for all Alternatives

Refer to the Biological Assessment in the project file for more detailed information regarding determination of effects to ESA listed fish species and their habitat.

Alternative 1- No Action Alternative

As the No Action Alternative, there would be no proposed mining activity and connected mining actions under this Alternative. Therefore, there is no mechanism for direct, indirect effects and no contribution to cumulative effects to ESA listed fish species and their designated critical habitat and USFS R6 sensitive fish, aquatic invertebrates and their habitat under Alternative 1. Therefore, there would be *no effect* to Proposed, Endangered, and Threatened fish species and DCH and *no impact* to Sensitive fish and aquatic invertebrate species and their habitat and Essential Fish Habitat.

Alternative 2 - Miner's Proposed Plan of Operation

Alternative 2 meets purpose and need under 36 CFR 228.4 and 228.5 including inspection, monitoring and reporting requirements. Alternative 2 does not meet some PACFISH mining standards and guidelines (Table 3-37). Under Alternative 2, some proposed Plans include proposed mitigations with bonds that would not avoid adverse impacts to listed fish and retard RMO's, for example, newly constructed temporary roads, settling ponds and processing sites and placer activity within the RHCA without adequate site-specific protection measures. These operations have not proposed methods to prevent sediment discharge into the stream.

A summary of determination of effects analysis and rationale is presented in Table 3-38. Determinations are made for ESA listed species and their designated critical habitat and determination of impacts to Essential Fish Habitat. A determination of effects to Regional Sensitive Species is displayed in Table 3-40.

Alternative 3 - Miner's Proposed Plan of Operation with Forest Service Requirements

A summary of determination of effects analysis and rationale is presented in Table 3-39. Determinations are made for ESA listed species and their designated critical habitat and determination of impacts to Essential Fish Habitat. A determination of effects to Regional Sensitive Species is displayed in Table 3-40.

The Forest Service has an understanding with ODEQ to cooperate in meeting State and Federal water quality rules and regulations (MOU between USDA Forest Service and Oregon Department of Environmental Quality, 2002). This MOU assigns responsibility for consistency with the TMDL to the Forest Service as the "designated management agency" on Forest Service lands. This responsibility obligates the Forest Service to participate in the TMDL process and responsibilities include a Water Quality Management Plans (WQMPs). Forest WQMPs rely on current laws, management plans, and BMP's to provide the basis for improving water quality in the forested landscape.

More specifically, General Requirements for Lode Mines L1-L11, Road-related Requirements Z1-Z14, and Reclamation Requirements R1-R18 are requirements and water quality protection measures that eliminate or lessen the impacts of possible sedimentation and chemical contaminant impacts from proposed mining operations. A combination of these general requirements and site-specific protection measures such as requiring a miner to obtain a 401 certification from ODEQ, limiting stream fording, and stringent monitoring specifically address sedimentation/chemical contaminant issues on Eddy Shipman, Tetra Alpha, Republican Comeback, L&H, Grubsteak, and Hopeful 2&3 that contribute to effects within the project area.

Given Forest obligations and direction under WQMPs, the UNF and WWNF Forest Plans, current monitoring data, Best Management Practices (including Site-Specific protections measures (Appendix 1A) and General Requirements (Appendix 2)), and considering the area of mining disturbance at each site, the potential effects to riparian areas and water quality from Alternative 3 would not incrementally add to past, present, or reasonably foreseeable future activities to cause cumulative effects to native fish populations including ESA listed fish species and their DCH, and R6 sensitive fish and aquatic invertebrate species and their habitat.

Alternative 2 – Miner’s Proposed Action**Table 3-38: Determination of Effects to MCR Steelhead (MIS), Bull trout and impacts to Essential Fish Habitat (EFH)**

Plan	Determin- ation of effects on steelhead and their DCH	Determin- ation of effects on bull trout and their DCH	Determin- ation of impacts to EFH	Rationale
Lucky Strike	No Effect	No Effect	No Impact	Distance from perennial fish bearing waters and DCH.
Muffin	No Effect	No Effect	No Impact	Distance from perennial fish bearing waters and DCH.
Royal White	No Effect	No Effect	No Impact	Distance from perennial fish bearing waters and DCH.
Yellow Gold	No Effect	No Effect	No Impact	Distance from perennial fish bearing waters and DCH.
Altona	NLAA	No Effect	No Impact	Low probability of effects due to distance from perennial fish bearing waters and DCH.
Bunch Bucket	NLAA	NLAA	MIIH ³	Distance of activity and existing dredge tailings between the activity and Clear Cr. Existing roads and ponds would be used. No proposed actions would further impact site stability i.e. sedimentation concerns, and no measureable impacts to temperature and instream structures or habitat.
City Limits	NLAA	NLAA	MIIH	Distance of activity from perennial fish bearing waters and DCH. There are existing dredge tailings and USFS 7300 RD between mining activity and Granite Cr. Existing roads and ponds would be used. No proposed actions would further impact site stability i.e. sedimentation concerns and no measureable impacts to temperature and instream structures or habitat.
Hopeful 1	NLAA	NLAA	MIIH	Mining activity is on a developed recreation site, no proposed actions would further impact site stability i.e. sedimentation concerns and no

³ May Impact Individuals and Individual Habitat but, is not likely to result in a trend toward federal listing, and continued viability is expected on UNF and WWNF

Plan	Determination of effects on steelhead and their DCH	Determination of effects on bull trout and their DCH	Determination of impacts to EFH	Rationale
				measureable impacts to temperature and instream structures or habitat. There is a large berm of historic tailings separating the work site from Granite Cr.
Sunshine/McWillis	NLAA	No Effect	No impact	There is a culvert barrier at the confluence of McWillis Gulch and Olive Cr. This area has been previously heavily mined, suction dredging would take place when stream conditions are intermittent or at base flow. There is No bull trout or bull trout DCH.
Yellow Jacket	NLAA	No Effect	No impact	Distance of activity from occupied habitat during season of operation. There are several mine tailings between activity and stream channel. No proposed actions would further impact site stability i.e. sedimentation concerns, and no measureable impacts to temperature and instream structures or habitat. Potential suction dredging would take place when stream conditions are intermittent. Processing is on Private lands. No bull trout or bull trout DCH.
East Ten Cent	LAA	No Effect	No Impact	No bull trout or bull trout DCH. Sedimentation concerns and disturbance to the RHCA due to road access issues are not addressed with site specific protection measures and could have water quality impacts.
Grubsteak	LAA	LAA	MIIH	Sedimentation issues associated with proposed stream crossing and constant stream fording with heavy machinery and flow disturbance to Clear Cr. due to the proximity of mine excavation.
L&H	LAA	No Effect	No Impact	No bull trout or DCH. Effects from proposed steam fording with heavy machinery. No site specific protection measures to address water quality impacts from chemical contamination from adits.
Make It	LAA	LAA	MIIH	No site specific protection measures to address water temperature concerns associated with mining activity.
Rose Bud 1-4	LAA	LAA	MIIH	No site specific protection measures to address sedimentation concerns associated with mining activity and subsurface discharge from settling ponds to Granite Cr.
Belvadear	LAA	No Effect	No impact	There are concerns with subsurface sediment discharge and downstream water temperature effects with water withdrawal. There is no bull trout

Plan	Determination of effects on steelhead and their DCH	Determination of effects on bull trout and their DCH	Determination of impacts to EFH	Rationale
				presence or bull trout DCH.
Blue Sky-Bull Run	LAA	LAA	MIIH	Bull Run is a 303d listed stream for sediment impairment. Potential direct effects due to proposed suction dredging
Blue Smoke	LAA	LAA	MIIH	Potential of direct effects due to proposed suction dredging.
Eddy Shipman	LAA	LAA	No impact	Potential for minor discharge and disturbance to RHCA and indirect effects due to fording.
Hopeful 2&3	LAA	LAA	MIIH	Direct effects to due to stream fording. Active area of disturbance is 0.25 acres (Table 4).
Lightning Creek	LAA	LAA	MIIH	Potential direct effects due to proposed suction dredging
Little Cross 1	LAA	LAA	MIIH	Potential direct effects due to proposed suction dredging
Old Eric 1&2	LAA	LAA	MIIH	Potential direct effects due to proposed suction dredging and an increase in stream temperatures due to warm water from settling pond and subsurface flow into Granite Cr.
Olive Tone	LAA	No Effect	No impact	No bull trout DCH or EFH, however, indirect temperature effects to steelhead and DCH with maximum water withdrawal (8 cfs) from Olive Creek during time of operation.
Ruby Group	LAA	LAA	No impact	Potential for discharge due to fording of Ruby and Clear creeks. Sedimentation concerns from seasonal road use on a closed FS road (not administratively maintained) during the wet season.
Tetra Alpha Placer	LAA	LAA	No impact	Potential effects due to newly created temporary roads and constructed fords.
Tetra Alpha Mill & Lode	LAA	LAA	No impact	Potential effects from use of settling ponds resulting in discharge of heavy metals into the stream.
Troy D	LAA	NLAA	MIIH	Possible measurable sediment impacts due to subsurface flow of sediment from settling ponds. May cause increased turbidity.

Alternative 3- Proposed Plan of Operation with Forest Service Requirements

Table 3-39: Determination of Effects to MCR Steelhead (MIS), Bull trout and impacts to Essential Fish Habitat (EFH).

Plan	Determin- ation of effects on steelhead and their DCH	Determin- ation of effects on bull trout and their DCH	Determin- ation of impacts to EFH	Rationale
Lucky Strike	No Effect	No Effect	No Impact	General Requirements (Appendix 2), Distance from perennial fish bearing waters and DCH.
Muffin	No Effect	No Effect	No Impact	General Requirements, Distance from perennial fish bearing waters and DCH.
Royal White	No Effect	No Effect	No Impact	General Requirements, Distance from perennial fish bearing waters and DCH.
Yellow Gold	No Effect	No Effect	No Impact	General Requirements, Distance from perennial fish bearing waters and DCH.
Altona	NLAA	No Effect	No Impact	General Requirements and low probability of effects due to distance from perennial fish bearing waters and DCH No bull trout DCH. Area of active disturbance is .02 acres (Table 4).
Bunch Bucket	NLAA	NLAA	MIIH	Distance of activity and existing dredge tailings between the activity and Clear Cr. Existing roads and ponds would be used. No proposed actions would further impact site stability i.e. sedimentation concerns, and no measureable impacts to temperature and instream structures or habitat. General Requirements apply. Area of active disturbance is .01 acres (Table 4).
City Limits	NLAA	NLAA	MIIH	Distance of activity and area of pre-disturbance. There are existing dredge tailings and USFS 7300 RD between the project site and Granite Cr. and DCH. Existing roads and ponds would be used. No proposed actions would further impact site stability i.e. sedimentation concerns, and no measureable impacts to temperature and instream structures or habitat. General Requirements apply. Area of active

Plan	Determination of effects on steelhead and their DCH	Determination of effects on bull trout and their DCH	Determination of impacts to EFH	Rationale
				disturbance .01 acres.
East 10 Cent	NLAA	No Effect	No Impact	No bull trout or bull trout DCH. Test digs would be in existing tailings. A large existing waste rock berm separates mining activity from Ten Cent Cr. Waste rock would continue to improve this existing berm. Additionally, a small bench (~15 ft. wide) separate the activity from the creek. General Requirements (Appendix 2) and site specific protection measures (Appendix 1A) PDC's apply Area of active disturbance is .01 acres.
Grubsteak	NLAA	NLAA	MIIH	Activity would be in existing dredge tailings that are not vegetated. Given the flat topography and existing tailings there is no risk of surface discharge into the Creek with General Requirements and site specific protection measures. The ford would be used occasionally and site A and B must be reclaimed at the end of the season. The ford would be constructed over hardened dredge tailings. Active area of disturbance is 0.25 acres (Table 4)
Hopeful 1	NLAA	NLAA	MIIH	Activity is in a hillslope on an already developed recreation site. A backhoe would only be used twice during the operating season with the majority of work with pick and shovel. There are historic tailings and an old cabin between mining activity and Granite Cr. No proposed actions would further impact site stability i.e. sedimentation concerns, and no measureable impacts to temperature and instream structures or habitat.
L&H	NLAA	No Effect	No Impact	There would only be occasional use of heavy machinery. One test hole would be open at a time. Existing roads and landings would be used. There are historic dredge tailings between placer and lode claims and Olive Creek. Steelhead DCH is 0.5 miles downstream and there is no bull trout or bull trout DCH. General Requirements and site specific protection measures apply. Area of active disturbance is .01 acres (Table 4).
Make It	NLAA	NLAA	No impact	Mining activity is greater than 100 ft from Granite Cr. Only 15-20 cubic yds. would be processed in an operating season. Miner would

Plan	Determination of effects on steelhead and their DCH	Determination of effects on bull trout and their DCH	Determination of impacts to EFH	Rationale
				use existing roads and pond. General Requirements and site specific protection measures apply. Area of active disturbance is .01 acres (Table 4).
Rose Bud 1-4	NLAA	NLAA	MIIH	Distance of Granite Cr. and DCH from mining activity. Existing dredge tailings and County 24 RD and FS 1035 RD are located between project activity and Granite Cr. Existing roads and ponds would be used. No proposed actions would further impact site stability i.e. sedimentation concerns and no measureable impacts to temperature and instream structures or habitat. General Requirements and site specific protection measures apply. Area of active disturbance is .01 acres (Table 4).
Sunshine/McWillis	NLAA	No Effect	No impact	Activity is located 0.5 miles upstream of steelhead DCH. There is a culvert barrier at the confluence of McWillis Gulch and Olive Cr. This area has previously been heavily mined, General Requirements and site specific protection measures are in place and suction dredging would take place when stream conditions are intermittent or at base flow. No bull trout or bull trout DCH. Active area of disturbance is 0.25 acres (Table 4).
Tetra Alpha Mill & Lode	NLAA	NLAA	No impact	Low probability of disturbance from mining activities.
Troy D	NLAA	NLAA	MIIH	Excavation would be in old dredge tailings, activity would be 25 feet away from the creek with a large berm of historic tailings separating activity from Granite Cr. Only one test hole would be open at a time. Miners would use existing roads and settling ponds. The trailer and processing plant are self-contained. General Requirements and site specific protection measures. Active area of disturbance is 0.01 acres (Table 4).
Yellow Jacket	NLAA	No Effect	No impact	Distance of activity from occupied steelhead habitat and DCH during season of operation (Table 8 and 9). Activity is in old dredge tailings. There is a large berm of mine tailings between activity and stream channel. No proposed actions would further impact site stability i.e.

Plan	Determination of effects on steelhead and their DCH	Determination of effects on bull trout and their DCH	Determination of impacts to EFH	Rationale
				sedimentation concerns, and no measureable impacts to temperature and instream structures or habitat. Potential suction dredging would take place when stream conditions are intermittent. Given flow, activity and impacts would be isolated. All processing is on Private lands. No bull trout or bull trout DCH. Active area of disturbance is 0.25 acres (Table 4).
Belvadear	LAA	No Effect	No impact	Potential for discharge and disturbance to the RHCA. Removal of existing vegetation. There are concerns with subsurface sediment discharge and downstream water temperature effects with water withdrawal. There is no bull trout presence or bull trout DCH. Active area of disturbance is 0.25 acres (Table 4). General Requirements and site specific protection measures apply.
Blue Sky-Bull Run	LAA	LAA	MIIH	Potential discharge and direct effects due to suction dredging and fording of the stream. Additionally Bull Run is a 303d listed stream for sediment impairment. Active area of disturbance is 0.2 acres (Table 9). General Requirements and site specific protection measures apply.
Blue Smoke	LAA	LAA	MIIH	Potential of direct effects due to proposed suction dredging. Active area of placer disturbance is 0.25 acres (Table 4). Placer operations are isolated. Historic dredge tailings and County Rd 24 and FS 1350 separate mining activity from Granite Cr. and DCH. General Requirements and site specific protection measures apply.
Eddy Shipman	LAA	LAA	No impact	Potential for minor discharge and disturbance to RHCA and indirect effects due to fording. Active area of disturbance is 0.25 acres (Table 4). General Requirements and site specific protection measures apply.
Hopeful 2&3	LAA	LAA	MIIH	Direct effects to due to stream fording. Active area of disturbance is 0.25 acres (Table 4). General Requirements and site specific protection measures apply.
Lightning Creek	LAA	LAA	MIIH	Potential direct effects due to proposed suction dredging. Placer activities are >150 away from Lightning Cr. Active area of

Plan	Determination of effects on steelhead and their DCH	Determination of effects on bull trout and their DCH	Determination of impacts to EFH	Rationale
				disturbance is 0.12 acres (Table 4). There are historic tailings and a closed road that separate activity from Lightning Cr. Miner would use existing ponds and roads. General Requirements and site specific protection measures apply.
Little Cross 1	LAA	LAA	MIIH	Potential direct effects due to proposed suction dredging. Placer operations are >50 ft away from Granite Cr. Large historic tailings separate mining activity from Granite Cr. and DCH. Active area of disturbance is 0.25 acres (Table 4). General Requirements and site specific protection measures apply.
Old Eric 1&2	LAA	LAA	MIIH	Potential direct effects due to proposed suction dredging. Placer operations are >150 ft away from Upper Granite Cr. Active area of disturbance is 0.01 acres (Table 4). They would move no more than 5 yards in an operating season. General Requirements and site specific protection measures apply.
Olive Tone	LAA	No Effect	No impact	No bull trout DCH, however, indirect temperature effects to steelhead and DCH with maximum water withdrawal (8 CFS) from Olive Creek during time of operation. Active area of disturbance is 0.02 acres (Table 4) on a previously disturbed landing. Activities are 50 ft away from Olive Cr. General Requirements and site specific protection measures apply.
Ruby Group	LAA	LAA	No impact	Potential for direct effects due to fording of the stream. Active area of disturbance is 0.01 acres (Table 4). General Requirements and site specific protection measures apply.
Tetra Alpha Placer	LAA	LAA	No impact	Potential effects due to newly created temporary roads and constructed fords.

Regional Forest Special Status Sensitive Species

Table 3-40: Determination of Effects to Regional Forest Special Status Sensitive Species

R6 Sensitive Species	Determination			Rationale
	Alt. 1	Alt. 2	Alt. 3	
Western Ridged Mussel (WRM) (<i>Gonidea angulata</i>)	NI ⁴	MIIH ⁵	MIIH	WRM are assumed present in the analysis area, however, there have been very few observations of WRM in the Granite Watershed. Given WRM prefer stable low to mid-elevation streams with range rarely extending into headwater streams, the majority of proposed isolated mining activities would not overlap with WRM presence or affect downstream habitat. WRM can be more tolerant of fine sediments and may occupy depositional habitats and banks. In Alt 2 instream effects of suction dredge mining will be localized, and General Requirements and site specific protection measures proposed in Alt 3. would minimize short term increases in sediment mobilization from placer and suction dredge mining activities that could impact WRM habitat.
Shortface Lanx (<i>Fisherola nuttalli</i>)	NI	MIIH	MIIH	Shortface Lanx are assumed present in the analysis area, however, there have been very few observations of Shortface Lanx in the Granite WS. Given Shortface Lanx occur in large low to mid-elevation riverine habitats that are unpolluted, cold, and well oxygenated, the majority of proposed isolated mining activities are not in proximity of suitable Shortface Lanx habitat or presence. In Alt 2 instream effects of suction dredge mining will be localized, and General Requirements and site specific protection measures proposed in Alt 3 would minimize short term increases in sediment mobilization from placer and suction dredge mining activities that could impact downstream Shortface Lanx habitat.
Columbia clubtail (<i>Gomphus lynnae</i>)	NI	MIIH	MIIH	Columbia Clubtail has not been documented in the Granite Watershed but, they are assumed present given Columbia Clubtail can occupy a variety of river habitats, which, can range from large sandy, muddy or rocky shallow rivers. There is a possibility that mining activities could occur in these habitats, however, there should be no measureable impacts to the Columbia Clubtail given season of mining activity, scale of mining operations, and the life history of the Columbia Clubtail.
Westslope Cutthroat Trout (WCT) (<i>Oncorhynchus clarki lewisi</i>)	NI	MIIH	MIIH	Westslope Cutthroat Trout (WCT) are found throughout the Granite Watershed where they have coevolved and coexisted with native steelhead/redband trout. Given General Requirements and site specific protection measures and for reasons already stated in Tables 16 and 17, mining impacts that are likely to affect (NLAA and LAA) listed Mid-C River Steelhead and Bull trout may also impact WCT individuals and individual habitat, but is not likely to result in a trend toward federal listing because of the dispersed locations of the mining activities and the low number of suction dredging actions, and continued viability is expected on the UNF and WWNF.

⁴ No Impact

⁵ May Impact Individuals and Individual Habitat but, is not likely to result in a trend toward federal listing, and continued viability is expected on UNF and WWNF

Management Indicator Species

Given the magnitude of activity and area of disturbance (Table 3 and 4), mining activities under Alternative 2 may impact Mid-C Steelhead and Interior Redband Trout and their habitat but is not likely to result in a trend toward federal listing and continued viability is expected on the UNF and WWNF (Tables 14 and 16).

Given the magnitude of activity and area of disturbance (Table 3 and 4) and Forest Service General Requirements, mining activities under Alternative 3 may impact Mid-C Steelhead and Interior Redband Trout and their habitat, but is not likely to result in a trend toward federal listing and continued viability is expected on the UNF and WWNF (Tables 15 and 16).

Compliance with the Forest Plan and Other Direction

Water Quality Management Plans (WQMP) covering US Forest Service lands are in place in the North Fork John Day River Basin. Forestry WQMPs rely on current laws, management plans, and BMPs to provide the basis for improving water quality in the forested landscape. All federal land management activities must follow standards and guidelines found in the Umatilla and Wallowa-Whitman National Forest Plans, as amended by PACFISH (USDA and USDI 1995). PACFISH provides management direction in the form of interim Riparian Habitat Conservation Areas (RHCAs) and Standards and Guidelines.

Alternatives 1 (No Action) and 3 are consistent with Forest Plan direction regarding native fish populations. Alternative 3 incorporates Forest Service Requirements, which, are a combination of applicable 2012 National Best Management Practices, Forest Service General Requirements (Appendix 2) and site-specific protection measures (Appendix 1A), and monitoring measures that are in compliance with state and federal water quality rules and regulations. The State of Oregon Department of Environmental Quality (ODEQ) has completed Total Maximum Daily Loads (TMDLs) for the North Fork John Day Subbasin (2010). Alternative 3 was designed to meet all water quality regulatory requirements for the UNF and WWNF. Given these Forest Service Requirements, none of the potential direct/indirect/cumulative effects would prevent attainment of PACFISH Riparian Management Objectives (HUC 6) or steelhead/redband and bull trout trout population viability. Application of PACFISH direction would maintain or improve fish habitat conditions in the analysis area; therefore there would not be adverse modifications to critical habitat or adverse effects to listed fish, as per applicable PACFISH objectives and guidelines.

First Foods – Confederated Tribes of the Umatilla Indian Reservation (CTUIR)

First Foods is the basis for natural resource management by the people of CTUIR, with a long-term goal of restoring native foods for the Tribal community. In the CTUIR tribal creation belief, the Creator asked the foods "who will take care of the Indian people?" Salmon was first to promise, then the other fishes lined up behind salmon. Next were deer, then cous, then huckleberry. The First Foods serving ritual in the longhouse is based on this order and reminds people of the promise the foods made, and the people's

reciprocal responsibility to respectfully use and take care of the foods. The First Foods service order begins with water, essential to sustain all life. Following water is salmon, then deer, then cous, then huckleberry.

The 28 Plans of Operation described in the Granite Mining EIS have the potential to affect First Foods of CTUIR. The primary effect would be to water and salmon, since most claims are in or near water. In general, the effects to first foods of water and salmon are summarized below.

There are seven operations that propose suction dredging. Suction dredge operations have the greatest potential to affect water and salmon. These occur across the Granite Mining watershed. All miners must receive a suction dredge permit, and follow State of Oregon laws and regulations.

Smaller effects are from other activities occurring in the stream, including

- Fording streams by trucks (four Plans) which creates sediment and disturbs fish
- withdrawing water for operations (two Plans)

The smallest effects are from activities on the stream bank. These include

- Digging test holes which creates sediment that can move into stream channels
- Operating mining equipment on the stream banks (such as high bankers and sluice boxes)
- Removing stream bank vegetation which can affect stream bank stability and decrease shade to streams and remove a food source for fish

From a watershed-wide perspective, these 28 claims are scattered throughout the 94,526 acre Granite watershed, with 104 acres analyzed under this EIS. No miner may disturb more than 0.25 acres at one time, and each 0.25 acres must be restored before another 0.25 acre may be mined. In addition, a maximum of 200 cubic yards (~ 3,240 square feet) of streambed could potentially be disturbed by suction dredging in this project (25 cubic yard per claim multiplied by 8 claims; see Table 3 of the BA for further effects analysis of suction dredging). To provide context there are about 24 miles of salmon/steelhead/bull trout habitat in the Granite watershed with an estimated 1,267,200⁶ square feet of instream fish habitat in this watershed.

The Forest Service has established General Requirements, Water Resource Protection Measures and Fish Protection Measures that allow the miner to continue to operate their claim but also includes additional actions the miner must take to protect water quality and fish resources. These protection measures would greatly reduce the impacts to First Foods water and fish.

⁶ 24 miles x 5,280 feet x 10' average stream width

Wildlife

Introduction

A biological evaluation for proposed, endangered, threatened or sensitive (TES) wildlife species in the Granite Creek Watershed has been completed and is available in the project file. A summary of determinations for those species is displayed in Table 3-41 below.

TES Species and Habitat

Table 3-41: Summary of Determinations

Species	Scientific name	Status	Determination ¹
Birds			
Lewis's woodpecker	<i>Melanerpes lewis</i>	Sensitive	MII
White-headed woodpecker	<i>Picoides albolarvatus</i>	Sensitive	MII
Mammals			
Gray wolf	<i>Canis lupus</i>	Sensitive	MII
Canada lynx	<i>Lynx canadensis</i>	Threatened	NE
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Sensitive	MII
Spotted bat	<i>Euderma maculatum</i>	Sensitive	NI
Fringed myotis	<i>Myotis thysanodes</i>	Sensitive	MII
Amphibians			
Columbia spotted frog	<i>Rana luteiventris</i>	Sensitive	MII
Invertebrates			
Fir pinwheel	<i>Radiodiscus abietum</i>	Sensitive	NI
Western bumblebee	<i>Bombus occidentalis</i>	Sensitive	NI
Johnson's hairstreak	<i>Callophrys johnsoni</i>	Sensitive	NI
Intermountain sulphur	<i>Colias christina pseudochristina</i>	Sensitive	MII
Yuma skipper	<i>Ochlodes yuma</i>	Sensitive	MII

¹ MII = may impact individuals and or habitat but not likely to cause a trend to Federal listing or a loss of viability; NE = no effect; NI = no impact.

The biological evaluation determined there would be no effect or impact to Canada Lynx, Spotted bat, Fir Pinwheel, Western bumblebee, and Johnson's hairstreak. These determinations were based on either no known population present within the Granite Creek watershed, the species is not expected to occur on any of the mining sites, and/or the scale of the mining operations is small enough that it would not hinder the capability of the watershed to support a population if one should establish there. Therefore, because there

would be no direct/indirect or cumulative effects to those species, they will not be further discussed in this document.

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

There would be no direct/indirect or cumulative effect on any of the above proposed, endangered, threatened or sensitive wildlife species because no mining activity would occur.

Lewis's and White-headed Woodpeckers

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

Due to the low potential for tree removal on any mining site, it is unlikely that Lewis's woodpecker or white-headed woodpecker would be affected by the project. Although, if individuals of either species were located within the vicinity of an active mining operation, the birds may shift spatially outside of the area. The determination for both species is **“may impact individuals and or habitat but not likely to cause a trend toward federal listing or a loss of viability”**.

Cumulative Effects of Proposed Mining Activities

Past, present, and ongoing habitat loss pose a threat to the continued existence of the Lewis's woodpecker throughout its range (Wisdom et al. 2000). Amounts of old-growth ponderosa pine remaining in Oregon are unknown, but are probably less than 10 percent of what occurred in pre-European settlement times (Marshall 1997). The loss has occurred mainly through a combination of timber harvest, road building, and fire. Among the most significant and greatest declining wildlife habitat in the Interior Columbia Basin is late and old-growth forest structure. Wisdom et al. 2000 concludes that source habitats for most species declined strongly from historical to current periods across large geographic areas. Strongest declines were for species dependent on low-elevation, old-forest habitats. The white-headed woodpecker was the highest for any species in that group. Much of the remaining late- and old-forest structure on the managed forest exists in remnant stands, often isolated from similar habitat.

Gray Wolf

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

The 28 mining sites provide habitat capable of supporting wolves. The grasses and browse that grow on disturbed areas where mining has taken place may attract some deer and elk, which are prey for wolves. The mining activities as described would unlikely have negative effects to gray wolves. Although wolves could be temporarily displaced during operational activities, this would have no impact on wolf populations, reproduction, or mortality of individual wolves.

Cumulative Effects of Proposed Mining Activities

Because this project will not have a measureable direct or indirect effect on gray wolves, it will not contribute to cumulative effects to gray wolves or their habitat.

Determination

The project area has potential to be used by wolves, but there is no current recorded use by this species. Mining activities may cause prey to leave the immediate area of individual mining claims, thereby affecting wolf movements. Implementation of any of the action alternatives **“may impact individuals and or habitat but is not likely to cause a trend toward federal listing or a loss of viability.”**

Townsend’s big-eared bat and Fringed myotis

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

The project area does contain similar habitat features typically used by these species, including potential roost trees and open forest foraging areas. Four plans have adits proposed for activity: Eddy Shipman, L&H, Royal White, and Tetra Alpha. If any of those adits currently serve as roost sites then bats would likely be displaced when these adits become active again. There is a chance that some bats could be displaced once placer mining resumes at some of the mine sites. This displacement could happen from the increased level of noise, ground vibration, and human presence at the sites. However, this risk is low given that most bats are isolated from these disturbances when roosting during the day. Mining operations typically do not occur during night time hours when bats emerge to feed and water.

Existing ponds created from past mining operations now serve as valuable watering sites for bats. These ponds also attract insects on which bats feed. Some ponds will not be disturbed when work resumes at these 28 sites. However, several ponds will be cleaned out and used for mining operations. These uses will not likely deter bats from feeding and watering at the ponds.

The surrounding forests also provide day roosts and feeding habitat. Very few trees will be cut at the mine sites, and the surrounding forested landscape will not be affected by the mining in regard to how bats utilize this habitat. Some snags may be felled during implementation of the project if they represent a safety hazard to personnel or equipment.

The few sites that do have unique structures (old buildings) will not change from their current condition, so risk to bats is relatively low. If displacement of bats occurs at some of the sites due to increased noise and human activity, those bats may find other suitable roosts at other inactive mines in the area. Old mining structures are common in the vicinity of these projects, so options exist for displaced bats.

Cumulative Effects of Proposed Mining Activities

Ongoing and reasonably foreseeable actions within the Granite watershed include watershed restoration activities, grazing, timber harvest, firewood gathering, and prescribed burning. All of these projects have the capability to have cumulative effects on the Townsend's big-eared bat and fringed myotis if they impact roost sites or insect prey availability. The additional habitat loss that may occur as a result of these mining operations may impact individuals in the short term but should not lead to a loss of population viability due to the small scale of each mining operation.

Determination

The determination for Townsend's big-eared bat and fringed myotis is "may impact individuals and or habitat but not likely to cause a trend toward Federal listing or a loss of viability".

Columbia Spotted Frog (*Rana luteiventris*)

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

Spotted frog habitat would be disturbed and frogs may be killed or displaced during mining operations at existing ponds. This project may impact individuals through direct mortality from crushing with equipment and through displacement from cleaning and using existing ponds. The habitat provided by settling ponds was created from past mining activity. These features will be made temporarily unusable when mining is occurring. However, the plans of operation stipulate that upon completion of mining the ponds will be reshaped to specifications outlined by the Forest Service. These specifications were developed to provide spotted frog breeding habitat. On existing ponds the miner should slope sides from 0 to 18 inches deep along the north, west, and east edges. This sloped portion of the pond should be a minimum of 3 feet in width (most importantly on the north, west, and east sides, but may be sloped all the way around). Existing ponds that do not have water in them except during operations, and ponds which are being created for mining purposes, need to be filled in upon completion of operations.

Cumulative Effects of Proposed Mining Activities

Ongoing and reasonably foreseeable actions within the Granite watershed include watershed restoration activities, grazing, timber harvest, and prescribed burning. All of these projects have the capability to have cumulative effects on the spotted frog if they impact habitat or prey availability. The additional habitat loss that may occur as a result of these mining operations may impact individuals in the short term but should not lead to a loss of population viability due to the small scale of each mining operation.

Determination

Although individuals may be impacted, this project is not expected to lead to a trend toward Federal listing. The determination for this species is "**may impact individuals and or habitat but not likely to cause a trend toward Federal listing or a loss of viability**".

Intermountain sulphur and Yuma skipper

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

There have been no surveys or recorded observations for these butterflies within the project area. Habitat alteration would occur for the larval host plant (if present) of the Yuma skipper and intermountain sulphur at most of the mine sites due to reworking the tailing piles at these sites. This should be a short-term effect as vegetation would become established again in the dredging piles after operations are complete. Johnson's hairstreak spends the majority of time in the upper forest canopy of mature forest; this project

would not remove any mature, old growth habitat so there should be no direct, indirect or cumulative effects. It is unknown at this time whether larval host plants or nectar plants of any of these species are located within any of the mining site locations.

Cumulative Effects of Proposed Mining Activities

Ongoing and reasonably foreseeable actions within the Granite watershed include grazing, timber harvest, and prescribed burning. All of these projects have the capability to have cumulative effects on the intermountain sulphur and Yuma skipper if they occur where host plants are present. The additional habitat loss that may occur as a result of these mining operations may impact individuals in the short term but should not lead to a loss of population viability due to the small scale of each mining operation.

Determination

Because little is known about the Intermountain sulphur and habitat alteration is likely to occur for the larval host plant of the Yuma skipper, the determination for these two species is “**may impact individuals and or habitat but not likely to cause a trend toward Federal listing or a loss of viability**”.

Management Indicator Species and Habitat

The management indicator species of the Wallowa-Whitman National Forest (WWNF) and the Umatilla National Forest (UNF) and the habitat or habitat component that they represent are shown in 2. Habitat conditions for management indicator species must be managed to maintain viable populations (*WWNF Forest Plan, page 2-9*) at the Forest or larger scale. All the species in Table 3-4 are known or suspected to inhabit the analysis area.

Table 3-42: Management Indicator Species

Species	Habitat	Forest
Pileated woodpecker (<i>Dryocopus pileatus</i>)	Old growth and mature forests	UNF and WWNF
Primary cavity excavators ¹	Snag and log habitat	UNF and WWNF
Northern goshawk (<i>Accipiter gentiles</i>)	Old growth and mature forest	WWNF
Rocky Mountain elk (<i>Cervus elaphus</i>)	Arrangement of cover and forage	UNF and WWNF
American marten (<i>Martes americana</i>)	Old growth and mature forest	UNF and WWNF
Northern Three-toed Woodpecker (<i>Picoides tridactylus</i>)	Snag and log habitat	UNF

¹ Northern flicker (*Colaptes auratus*), Lewis' woodpecker (*Melanerpes lewis*), yellow-bellied sapsucker (*Sphyrapicus varius*), Williamson's sapsucker (*Sphyrapicus thyroideus*), red-naped sapsucker (*Sphyrapicus nuchalis*), hairy woodpecker (*Picoides villosus*), downy woodpecker (*Picoides pubescens*), white-headed woodpecker (*Picoides albolarvatus*), Northern three-toed woodpecker (*Picoides tridactylus*), black-backed woodpecker (*Picoides arcticus*), mountain chickadee (*Parus gambeli*), black-capped chickadee (*Parus atricapillus*), white-breasted nuthatch (*Sitta carolinensis*), red-breasted nuthatch (*Sitta Canadensis*), and pygmy nuthatch (*Sitta pygmaea*).

Management indicator species are addressed in separate sections of this analysis that relate to the habitat they are associated with. For example, pileated woodpecker, northern goshawk, and American marten are covered in the old-growth habitat section, while the Northern three-toed woodpecker and primary cavity excavators are covered in the snag section.

Mature and Old Growth Forest Habitat

MA 15 is the management area designated in the Wallowa-Whitman National Forest Plan to “maintain habitat diversity, preserve aesthetic values, and to provide old-growth habitat for wildlife.” The Umatilla National Forest Plan also provides direction for management of dedicated old growth habitat (MA C1). Designated mature and old growth forest stands will be located and retained to distribute suitable habitat throughout the Forest for wildlife species dependent upon this habitat type. Forest stands will meet ecological, biological, size and distribution criteria as suitable old growth for survival and reproduction of indicator species (*UNF Forest Plan, page 4-149*). There are 1,763 acres within MA 15 and 1244 acres of C1 within the analysis area for a total of 3007 acres (3% of the analysis area). These areas are in small clumps scattered throughout the analysis area and 2 of the proposed mining sites fall within these areas (Eddy Shipman and Grubsteak). The management indicator species for old-growth habitat include the pileated woodpecker, northern goshawk, and American marten.

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

There would be no effects to designated old-growth areas (MA 15 and MA C1) or the species that depend on this kind of habitat. There would be no effects to non-designated old-growth forest habitat. Disturbed mine sites would continue to re-vegetate over time and may eventually develop into old-growth habitat. This would require greater than a century on most of the mine sites.

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

Effects to old growth and wildlife species dependent on this kind of habitat would be minor and immeasurable at meaningful scales. Mining on these 28 mine sites would set back vegetative succession on these sites for the duration of mining. Upon completion of mining and reclamation, succession would begin the slow process of re-establishing forested habitat. This process would take well over a century to develop old-growth forest habitat on these sites. Developing and managing old-growth forest habitat and mining are not compatible on the same acres. It is not reasonable to expect these mine sites to become old growth or support the management indicator species within the foreseeable future. The balance of the landscape not impacted by mining is where habitat for these management indicator species would be provided in conjunction with other forest and range objectives. The 2 proposed mining sites that fall within MA C1 are Eddy Shipman and Grubsteak. Eddy Shipman has a total area of 3 acres and Grubsteak has a total area of 2 acres. These 2 sites are on the periphery of old growth management areas and may cause enough disturbance to deter MIS species from using the area immediately surrounding the sites. A total of 5 acres of may be impacted by disturbance or by removal of trees that pose hazards. The small scale of this disturbance may temporarily displace individuals but will not be large enough to affect populations of any MIS species.

Cumulative Effects of Proposed Mining Activities

None of the alternatives would contribute to cumulative effects to mature and old-growth forest habitat or the species that utilize this habitat because no net reduction in old-growth habitat would result from either alternative.

Snags and Down Wood

The effect to primary cavity excavators from the loss (or reduction) of snags is a long-term absence of some woodpeckers from portions of their geographic range, and their ecological relationships with forest pests and secondary cavity users. Larger diameter snags can require 100 to 250 years to be replaced, and the species that require large snags generally do not have alternatives for nesting substrate. Woodpeckers are also known to contribute to maintaining forest pests (insects) at endemic levels. This function is lost when nesting and roosting habitat is lost or severely reduced over large portions of forested habitat. The primary cavity excavators (including pileated woodpecker) are management indicators on the Wallowa-Whitman and Umatilla National Forest.

Alternative 1 – No-action Alternative**Direct and Indirect Effects of No Action**

No snags, logs, or green trees would be cut or disturbed except what is lost to natural fall rates and the ongoing firewood program. There would be no direct or indirect effects to primary cavity excavators resulting from maintaining these 28 mine sites in an inactive status.

Alternatives 2 and 3 – Action Alternatives**Direct and Indirect Effects of Proposed Mining Activities**

These two alternatives would not have a measurable effect on snag or log habitat or to the species that use these habitat features at the landscape scale. There would be small-scale reductions in snag numbers because some snags may be cut to address hazards around work areas. However, very few potential danger trees were observed during field reconnaissance of the mine sites.

Few green trees would be removed and would not result in measurable effects to snag- and log-dependent wildlife species. The small scale of these effects would not reduce the ability of any primary cavity excavator species from using the project area.

Cumulative Effects of Proposed Mining Activities

The cumulative effects of these mines would be negligible based on the relatively small size of the project areas, spatial distribution of the mines, and the fact that so few trees and snags are proposed for removal.

Northern Goshawk

Northern goshawks are the largest accipiter in North America and are generally considered forest habitat generalists that persist and reproduce where at least a portion of their home range is in an old-growth condition. The goshawk is a management indicator species on the Wallowa-Whitman National Forest, and is specifically addressed in the Regional Forester's Eastside Forest Plan Amendment #2 (1993). No goshawk nests are known to exist within any of the project areas. If nests are located prior to or during

project implementation, district wildlife personnel would work with the miners and minerals personnel to mitigate effects to goshawks during the nesting season.

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

Retaining these 28 mine sites in an inactive condition would result in no change to the current condition. Vegetation would continue to recover on these sites, increasing forage and eventually cover for many species, but at localized, minor scales. The lasting effects of existing roads, tailings, and old mining activity would persist into the long term, but a “no action” decision would not worsen or change the existing condition.

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

Mining operations will not result in a reduction of suitable goshawk habitat. Disturbance from operations may temporarily displace individuals to other areas. If a goshawk nest(s) is discovered at any of the mine sites a seasonal restriction on the use of heavy equipment would be recommended in the immediate vicinity of the nest (Appendix 2, General Requirement G16). No mining sites are within a goshawk post-fledgling area.

Cumulative Effects of Proposed Mining Activities

Neither of the alternatives would contribute to cumulative effects to northern goshawks or their habitat because no loss of habitat would occur and potential nesting, foraging, and dispersal habitat is relatively abundant and widespread in the surrounding landscape.

Rocky Mountain Elk

Rocky Mountain elk is the most popular big game species in northeastern Oregon and is likely responsible for more recreation visitor days than any other single species or activity on the Forest. Elk are popular among wildlife watchers, outdoor photographers, and hunters. Elk are also a management indicator species on the Wallowa-Whitman and Umatilla National Forests. As a management indicator, elk serve to indicate the condition and function of the habitat that they share with numerous other wildlife species. Elk are an indicator of forage and cover abundance and quality, and the patch dynamics that comprise quality elk habitat. Additionally, elk serve as a meaningful indicator for those species that are sensitive to human activities since they exhibit greater individual and herd fitness when adequate security habitat is available. Also, in an effort to address culturally significant foods, this habitat analysis reflects the effects to this species.

Elk habitat is typically analyzed by assessing several habitat variables including forage quality/quantity, size and spacing of forage and cover patches, level of motorized access, and cover quality. These variables are combined to generate a numerical value referred to as a habitat effectiveness index (HEI). Since none of these variables would be altered by this project, an HEI analysis would be of no value.

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

Retaining these 28 mines in an inactive condition would result in no change to the current condition. As vegetation continues to recover on these sites, increased forage and eventually cover may provide for improved elk habitat, but at localized, minor scales. The lasting effects of existing roads, tailings, and old mining activity would persist into the long term, but a “no action” decision would not worsen or change the existing condition.

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

There would be little change in how elk use these areas, except for disturbance within and immediately surrounding the mines when work is being conducted. Disturbance from mining operations may displace elk to areas with less noise and lower quality forage and cover. Road densities would not change, because the proposed miner-created temporary access roads would not contribute to open road densities. Elk may avoid or reduce their use of the mining areas during periods of operation when human presence and motorized equipment are prevalent. No mining sites are within migration corridors or calving areas. Three main features that contribute to summer elk habitat effectiveness are riparian habitats or moist sites for thermal relief, open road densities that affect potential for disturbance/displacement, and livestock grazing, which may affect forage availability or cause displacement (Christensen et al. 1993). Although the localized area around the mine site would have reduced cover and forage, the contiguous habitat that surrounds the area should provide alternative suitable habitat.

Cumulative Effects of Proposed Mining Activities

The cumulative effects of proposed activities at these 28 mines would depend on which mines would be operating at the same time and their proximity to one another. This is impractical to predict since the plans of operation apply to a 10-year period, and the mining activity could be continuous, intermittent, or sporadic. If all the mines were active at the same time, it could result in cumulative effects that would affect elk distribution in the Granite watershed. Disturbance from these 28 mines, when combined with general motorized access, forest management activities, and various forms of recreation, could compound these effects. However, this disturbance would not threaten the viability of the elk population in this watershed.

Neotropical Migratory Birds

Neotropical migratory birds are those that breed in the United States and winter primarily south of the United States-Mexico border. They include a large group of species, including many hawks, shorebirds, warblers, and other songbirds, with diverse habitat needs spanning nearly all successional stages of most plant communities. Of the 225 migratory birds that are known to occur in the western hemisphere, about 102 are known to breed in Oregon.

Nationwide declines in population trends for neotropical migrants have become an international concern. Habitat loss is considered the primary factor in declines of neotropical migratory birds.

In 2000, the Oregon-Washington Chapter of Partners in Flight published its Landbird Conservation Plan (Altman 2000). The plan uses a “Priority Habitats and Species” approach. By managing for a group of species representative of important components in a functioning coniferous forest ecosystem, many other

species and elements of biodiversity would be conserved. The Granite Mining project areas lie predominantly in mixed conifer forest with variable amounts of dry conifer forest conditions as defined in the Landbird Conservation Plan. These focal species (Table) were selected based in part on their conservation need and degree of association with important habitat attributes in coniferous forests in the Blue Mountains.

Table 3-43: Forest conditions, associated habitat attributes, and focal species in the analysis area

Forest condition	Habitat attribute	Focal species
Dry Forest	Large trees and snags	White-headed woodpecker
Dry Forest	Old forest with openings	Flammulated owl
Dry Forest	Open understory with pine regeneration	Chipping sparrow
Mesic Mixed Conifer	Large snags	Vaux's swift
Mesic Mixed Conifer	Overstory canopy closure	Townsend's warbler
Mesic Mixed Conifer	Structurally diverse	Varied thrush
Mesic Mixed Conifer	Dense shrub layer	MacGillivray's warbler
Mesic Mixed Conifer	Edge and openings	Olive-sided flycatcher

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

Retaining these 28 mines in an inactive condition would result in no change to the current condition. As vegetation continues to recover on these sites, increased shrub cover may provide nesting habitat, but at localized, minor scales. The lasting effects of existing roads, tailings, and old mining activity would persist into the long term, but a “no action” decision would not worsen or change the existing condition.

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

Effects to neotropical migratory bird species that use this area would be negligible in terms of diversity and abundance. Mining operations occurring in spring through early summer could affect nesting neotropical migratory bird species; however, the relatively small scale of the individual project areas and the nature of the actions pose little risk of affecting overall populations.

In the short term, some nesting habitat may be lost as a result of operations, but the scale at which it would occur is not expected to measurably reduce neotropical migratory bird species richness or abundance. Some individual birds may experience shifts in home ranges as habitat is altered, but operations would not result in their complete displacement. These actions would not lead to a decline of neotropical migratory bird species habitat or populations.

Cumulative Effects of Proposed Mining Activities

Migratory birds are not only affected by actions that degrade habitat and disturb behaviors on their breeding grounds, but they are also in decline due to destruction, degradation, and disturbance on their wintering grounds and stopover locations. It is impossible to predict the effects of all threats that neotropical birds face along their migration corridors and wintering grounds. However, mining in the Granite watershed would not cause additional impacts to bird populations because the project would impact such a small portion of their available habitat.

Invasive Species

Invasive plants are defined as a non-native plant whose introduction causes or is likely to cause economic, environmental, or human health harm. An invasive species is distinguished from other non-natives by their ability to spread in native ecosystems. “Noxious weeds” on the other hand is a legal term used by state, county, and federal agencies to denote plants that pose particular threats, generally to agriculture. Many undesirable non-natives can be invasive and pose threats to healthy native plant communities but do not meet the criteria for listing as a “noxious weed.” For that reason, this analysis will focus on all invasive non-native plants and not just those listed as “noxious weeds.”

Invasive non-native species are currently damaging the biological diversity and healthy native plant communities located both on and off national forest system (NFS) lands. The introduction and subsequent spread of invasives can have a variety of environmental effects such as displacement of native species, reduction in suitable habitat, reduction in forage for livestock and wildlife, destruction of habitat and loss of TES species, increased soil erosion, water quality reduction, and significant reductions in soil productivity. The establishment and spread of non-native plants is a dynamic event that incorporates many diverse variables. Invasion theory, as it pertains to non-native species, contains three main principles: disturbance, propagule pressure, and competition (Hobbs & Huenneke 1992, Lockwood et al. 2005, Sutherland 2008).

Invasive species are quick to colonize an area of disturbance and can use their “weedy” life-history traits to establish within novel habitats. Disturbance such as fire, construction, mining disturbance, and commercial timber harvest can alter native plant communities and increase the chance of invasion by non-natives. Several factors such as type of disturbance, proximity to propagule source, and size or magnitude of disturbance can increase the propensity for invasion of an otherwise healthy plant community by non-natives.

The second factor in the invasion theory is propagule pressure. Propagule pressure is defined as the number of possible individuals (seeds, seedlings, etc.) released into a region in which they are not native and the number of such release events (Lockwood et al. 2005). In essence, the higher the propagule pressure (more seeds or more opportunities for a release) the greater the likelihood of a successful colonization. Many factors can lead to increased propagule pressure but the most likely cause is an increase in the number of release events. Many of the activities conducted on the NFS lands can lead to an increase in the propagule pressure including fire, timber sales and salvage, road construction, use of heavy equipment, recreation, and grazing.

Finally, the last principle of invasion theory is competition. Even though the ability of an invasive to spread or colonize new sites is generally species dependent, all invasive non-natives are considered potential threats to native plant communities.

Forest Plans

The Pacific Northwest Region (R6) Invasive Plant Program Record of Decision (ROD) (USDA 2005) amended the Forest Plans for both the Umatilla National Forest and the Wallowa-Whitman National Forest. The Region 6 ROD outlined 23 standards for the prevention and management of invasive non-native plants that have been added to all regional Forest Plans and require consideration of invasive species in all planning efforts. The regional ROD does not however approve any site-specific treatment,

instead requiring a completed analysis by each National Forest (see the specific sections below for each Forest's analysis).

Of the 23 prevention and management standards in the regional ROD, only five directly affect activities found in the Granite Mining project. These standards are:

1. Prevention of invasive plant introduction, establishment and spread will be addressed in watershed analysis; roads analysis.....vegetation management plans, and other land management assessments.
2. Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism, require the cleaning of all equipment (bulldozers, skidders, graders, backhoes, dump trucks, etc.) prior to entering National Forest Service lands.
3. Use weed-free straw and mulch for all projects, conducted or authorized by the Forest Service, on National Forest System Lands.
7. Use only gravel, fill, sand, and rock that are judged to be weed free by District or Forest weed specialists.
8. Conduct road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants in consultation with District or Forest-level invasive plant specialists.
13. Native plant materials are the first choice in re-vegetation for restoration and rehabilitation where timely natural regeneration of native plant community is not likely to occur

Under the Region 6 ROD, these standards apply to the prevention and management of all invasive non-native species and not just those listed as “noxious weeds”.

Wallowa-Whitman National Forest Invasive Species Plan

The Wallowa-Whitman National Forest completed the Wallowa-Whitman National Forest Invasive Plants Treatment Project Environmental Impact Statement and Record of Decision in 2010. Most of the existing invasive plant infestations within the Granite Mining EIS area on the WWNF National Forest are covered under this analysis and have proposed herbicide treatments for the high priority weed species.

In December 2012, Judge Simon, U.S. District Court of Oregon, issued an “Opinion and Order on Motion for Partial Vacatur”, remanding the 2010 decision to the Forest Service for reconsideration of cumulative effects, but allowing certain treatments to continue while the analysis is being completed. All infested sites can be treated by non-herbicide methods, which include mechanical, manual, and biological treatments. Herbicide treatments are permitted in accordance with the 2010 ROD (using the 10 herbicides evaluated in the FEIS and following project design features and buffering requirements) on approximately 5000 acres previously mapped under Decision Notices and Findings of No Significant Impacts for noxious weed management signed on April 2, 1993 and August 8, 1994. The site numbers associated with these 5000 acres are listed in Exhibit 1 of Judge Simon's Order.

Umatilla National Forest Invasive Species Plan

The Umatilla National Forest completed the Umatilla Invasive Plant Environmental Impact Statement and Record of Decision in 2010. Most of the existing invasive plant infestations within the Granite Mining EIS area on the Umatilla National Forest are covered under this analysis and have proposed herbicide treatments for the high priority weed species.

Effects Analysis Methodology

Specific Methodology

The descriptions, resources, and effects (expected and potential) were assessed using field surveys, literature documentation, documented site information, and professional judgment. Throughout this document, the intensity of the effect is graded on a qualitative scale using the effect levels of “NO” “LOW”, “MODERATE”, and “HIGH”. Those effects identified as low intensity will create little to no bare soils, and extremely limited potential for introduction of invasive plant material to the project area. If left untreated invasive species within these areas would not spread from current locations or expand from current levels at rates higher than those found in the absence of project activities. Moderate level activities are those that, with proposed mitigation measures, could be treated and reduced to pre-project levels, but without the implementation of these measures could begin to spread beyond current levels. Finally, a high intensity effect is one that could create opportunities for spread and introduction of invasive species that could not be mitigated with normal effort or proposed measures. A high intensity effect, if controllable, would likely require significant increase in invasive treatment activities or funding in order to control the infestations.

Data Sources

There are inventoried invasive non-native plant sites within the Granite project areas. The inventoried infestations are shown in the individual mining site forms in the project file. In addition to these listed species, the project area also includes *Ventenata dubia*, *Bromus tectorum*, and others that are potentially harmful invasive species but don't meet the requirement for listing on the state or county “noxious weed” lists. Treatment and monitoring records document all site visits by invasive plant specialists, spanning the years since initial discovery and inventory of the site. These records are on file at the appropriate District Office in Ukiah or Baker City, Oregon. These sites are visited on a regular basis for treatment and monitoring and can be relocated and identified on the ground when necessary.

Indicators

Direct and Indirect effects of proposed mining activities, access (roads, fords, bridges), and mitigation and monitoring requirements

Direct and indirect effects of the alternatives are identified and discussed, and effects of project level activities will be quantified as increases or decreases to the indicators listed below. Differences between alternatives will be displayed by comparing the potential change in the indicators from the existing conditions.

Potential Establishment

While direct/indirect effects on the potential establishment of non-native plants are difficult to predict and quantify, they would occur through ground disturbance and introduction of invaders into new areas. Disturbance is defined as a punctuated event or series of events that kill or damage existing organisms, directly or in-directly increase resource availability, and create an opportunity for new individuals to become established (Sousa 1984). Disturbance associated with minerals activities are expected through movement of heavy equipment, soil displacement, and vegetation compression; but the amount of disturbance can vary depending on activity density and type. Further, project activities can introduce new species into areas by transporting non-native plant material on machinery or personnel. Increased disturbance and access would increase the potential for new establishment of invasive non-native species in sites previously unoccupied.

Short-term timeframe: 1-2 years. This period of time would be long enough to notice the germination and growth of any new invasive non-native species after project activities.

Long-term timeframe: 25-30 years. This long term timeframe was chosen because climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this timeframe speculative. Further, changes in the plant community dynamics would have been identified by this point and establishment of invasive non-native plants would have been established.

Spatial Boundary: The boundary of the effects is the individual mining claims and buffered ¼ mile on all sides. This area contains the area of potential activity and gives a buffer to include the possibility of spread from outside the activity unit.

Methodology: In order to analyze the effects of project activities on the potential establishment of invasive non-native species, a qualitative estimate of the impact is reported on a site by site basis. The effect estimates are classified as “NO”, “LOW”, “MODERATE”, and “HIGH” effects and are based on the amount of ground disturbance proposed, whether that disturbance was pre-existing, and the proximity of invasive non-native species. A mining plan with little new ground disturbance and no known invasive non-native plants in the vicinity would be rated as low effect to potential establishment while a plan that proposes large-scale new ground disturbance with invasive non-native plants on site might be rated as a high effect.

Potential to Spread

While direct/indirect effects from the potential spread of non-native plants are difficult to predict and quantify, they would occur through ground disturbance and the possible increase in “invisibility” of a plant community after disturbance. Invasive plants are estimated to spread at 8-12 percent a year on NFS land (USDA 2005), but according to the R6 ROD (USDA 2005) the adoption and use of the standards shown above should reduce the rate of spread of invasive plants by over 50 percent (down to 4-6 percent). Increased disturbance and pre-existing invasive non-native sites in the vicinity of a mining operation would increase the potential for spread of invasive non-native species.

Short-term timeframe: 1-2 years. This period of time would be long enough to notice the increase in size of a known infestation, and allow for the rapid response to potentially contain that site after project activities.

Long-term timeframe: 25-30 years. This long-term timeframe was chosen because climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this timeframe speculative. Further, changes in the plant community dynamics would have been identified by this point and spread of invasive non-native plants would have been established.

Spatial Boundary: The boundary of the effects is the individual mining claims and buffered ¼ mile on all sides. This area contains the area of potential activity and gives a buffer to include the possibility of spread from outside the activity unit.

Methodology: In order to analyze the effects of project activities on the potential spread of invasive non-native species, a qualitative estimate of the impact is reported on a site by site basis. The effect estimates are classified as “NO”, “LOW”, “MODERATE”, and “HIGH” effects and are based on the amount of ground disturbance proposed, whether that disturbance was pre-existing, and the existence of known invasive non-native species infestations would be rated as a “no” effect to the potential spread while a plan that proposes large scale new ground disturbance with invasive non-native plants on site might be rated as a high effect.

Cumulative effects

Where direct and indirect effects, due to project activities occur, a cumulative effects analysis must be prepared. The cumulative effects analysis must account for all impacts from past, present, and reasonably foreseeable future activities.

Long-term timeframe: 25-30 years because climate change, unforeseeable future projects, demographic changes, and others make assumptions beyond this timeframe speculative.

Spatial Boundary: the cumulative effects analysis area for this project is confined to the project area only and those areas within a ¼ mile buffer of each proposed plan of operation. This area is appropriate because there are no expected direct or indirect effects from project activities outside of the ¼ mile buffer of each plan of operation or the project area boundary and thus no cumulative effects.

Methodology: In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects.

Affected Environment/Environmental Effects

Affected Environment

The existing condition of the project area as it pertains to invasive non-native species is described in a site by site manner for each proposed mining plan of operation (See project file for invasive species presence/condition on each specific mine sites). The conditions outlined were created from site visits and GIS queries. Table 3-44 shows a summary of all inventoried invasive non-native plants within the project area.

Table 3-44: Known Invasive Weed Presence in the Granite Project Area

Species Code	Common Name	Number of Sites	Acres
CEBI2	Spotted knapweed	18	91
LIVU	Yellow toadflax	6	177
CEDI3	Diffuse knapweed	13	141
CYOF	Houndstongue	5	40
PORE5	Sulfur Cinquefoil	*	*
HYPE	St. Johnswort	*	*
CIAR	Canada thistle	*	*
CIVU	Bull Thistle	*	*

Source: USDA FS 2012.. [*These species are not generally intensively inventoried. They are considered widespread. Biologicals, if available, are considered established.]

Environmental Effects

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

In this analysis the “no action” alternative would maintain the current condition as no new activities will be authorized. No proposed Plans or amendments to currently approved plans would be approved. There would still be other activities related to mining that could continue. Any notice of intent level work would still continue as this level of activity does not require analysis under NEPA. Other impacts to the establishment and spread of invasive non-native species would continue (i.e. recreation, wildfire and wildfire suppression, etc.).

Alternative 2

Direct and Indirect Effects of Proposed Mining Activities

Alternative 2 would authorize the approval of the Plans of Operations (Plans) as submitted by the miners. The total number of Plans proposed for approval under this alternative is 28. The Plans of Operations included in this alternative are in the project file. A summary of each proposed Plan of Operations can be found in Appendix 8.

All Plans would contain a variety of requirements to meet 36 CFR 228 Subpart A. All operations must meet all other applicable State and Federal laws, including but not limited to the Clean Water Act, the National Historic Preservation Act, the Archaeological Resource Protection Act, the Endangered Species Act, and all applicable State and Federal fire regulations.

Potential Establishment of Invasive Non-native Species

The direct and indirect effects in terms of magnitude, extent, duration, direction, and speed on the potential establishment of invasive non-native species for alternative 2 are discussed below. After consideration and analysis of each plan of operation the analysis will group similar operations together. This grouping is based on expected effects and impacts to the invasive non-native species, new miner-created temporary access roads, size of annual disturbance (identified as cubic yards removed per day), type and size of invasive species within the site, and proximity to other invasive non-native species.

- ***Moderate Effect Plans:*** There are 24 Plans that pose a moderate effect to potential establishment of invasive non-native species. These plans are Altona, Belvedere, Bunch Bucket, City Limits, Lucky Strike Placer/Mill, Olive Tone, Royal White Group, Sunshine/McWillis, Ruby Group, Yellow Gold, Yellow Jacket, Tetra Group Lode/Mill, L&H, Muffin, Eddy Shipman, Blue Sky/Bull Run, Blue Smoke, Grubsteak, Hopeful 2&3, Little Cross 1, Make It, Old Eric 1&2, Rose Bud 1-4, and Hopeful 1. These sites all have either no invasive non-native species within the ¼ mile buffer or have low-priority low-risk species. Each of the 24 above Plans are also proposing relatively little annual ground disturbance. The amount of ground disturbance on these claims would be less than 5 cubic yards/day of operation.

The potential effect from the establishment of new invasive non-native plants within previously un-infested areas is estimated to be moderate under Alternative 2. Without any mitigations or general requirements under this alternative, the greatest risk would be the establishment through introduction and movement of propagules on heavy equipment used for the mining activity. However, the low priority low risk species present, the location of these infestations, and the use of existing access roads would keep the effect of establishment from being high.

- **High Effect Plans:** There are 4 Plans that pose a high effect from the potential establishment of invasive non-native species. These plans are Tetra Alpha Placer, East Ten Cent, Troy D, and Lightning Creek. These sites all have larger infestations of higher priority invasive non-native species within the site and within the ¼ mile buffer, have proposed development of new miner-created temporary access roads, and are proposing larger scale ground disturbance as measured in cubic yards/day. The plans in this group propose to process more than 20 cubic yards/day.

The potential effect from the establishment of invasive non-native species under Alternative 2 for the 4 plans of operation mentioned above is high. The high effect conclusion was reached due to multiple factors. First, all of these Plans are proposing to have larger scale ground disturbance than the other Plans in this project. More ground disturbance would allow more opportunity for establishment of invasive non-native species. Second, the Plans in this group are proposing the use and development of new temporary road access that has not previously existed. Roadways and vehicle travel are one of the key factors to consider when analyzing the potential establishment of invasive non-native species. Generally, the more roads and access, the higher the likelihood of establishment of new invasive sites. Third, the existence of already identified invasive non-native species sites would increase the risk of further establishment. The proximity of current sites would increase the risk of establishment into newly-disturbed areas as the movement of propagules would increase. For these reasons, the Plans listed in this group are estimated to have a potentially high effect on the establishment of invasive non-native species as compared to the moderate effect group.

Potential Spread of Invasive Non-native Species

The direct and indirect effects in terms of magnitude, extent, duration, direction, and speed on the potential spread of existing invasive non-native species infestations for Alternative 2 are discussed below. After consideration and analysis of each Plan, the analysis will group similar operations together. This grouping is based on expected effects and impacts to the invasive non-native species, new miner-created temporary roads, size of annual disturbance (identified as cubic yards removed per day), type and size of invasive species within the site, and proximity to other invasive non-native species.

- **No Effect plans:** There are 13 Plans that pose no effect from the potential spread of invasive non-native species. These plans are Altona, Belvedear, Bunch Bucket, City Limits, Lucky Strike Placer/Mill, Olive Tone, Royal White Group, Sunshine/McWillis, Ruby Group, Yellow Gold, Yellow Jacket, Muffin, and L&H. These sites all have no invasive non-native species on the site or within the ¼ mile buffer.

The potential effect from the spread of existing invasive non-native infestations within these activity areas is a zero under Alternative 2 because there are no current existing infestations within the area.

- **Moderate Effect Plans:** There are 11 Plans that pose a moderate effect to the potential establishment of invasive non-native species. These plans are Tetra Group Lode/Mill, Eddy Shipman, Blue sky/Bullrun, Blue Smoke, Grubsteak, Hopeful 2&3, Little Cross 1, Make It, Old Eric 1&2, Rose Bud 1-4, and Hopeful 1. These sites all have infestations of invasive non-native species within the site or within the ¼ mile buffer, have no proposed new miner-created temporary access roads, and are proposing smaller scale ground disturbance as measure in cubic yards/day. The Plans in this group propose to process less than 5 cubic yards/day.

The potential effect from the spread of existing invasive non-native plants within the project area is estimated to be a moderate effect under Alternative 2. Without any mitigations or general requirements under this alternative, the greatest risk for the spread of invasive non-native species is through the creation of bare ground and movement of propagules on heavy equipment used for the mining activity. However, the location of these infestations, the use of existing access roads, and the smaller scale of disturbance proposed (< 5 cubic yards/day) would keep the effect of spread from being high.

- **High Effect Plans:** There are 4 plans of operation that pose a high effect to the potential spread of invasive non-native species. These plans are Tetra Alpha Placer, East Ten Cent, Troy D, and Lightning Creek. These sites all have larger infestations of higher priority invasive non-native species within the site and within the ¼ mile buffer, have proposed development of new miner-created temporary access roads, and are proposing larger scale ground disturbance as measured in cubic yards/day. The Plans in this group propose to process more than 20 cubic yards/day.

The potential effect from the spread of invasive non-native species under Alternative 2 for the 5 plans of operation mentioned above is high. The high effect conclusion was reached due to multiple factors. First, all of these plans are proposing to have larger scale ground disturbance than the other plans in this project. More ground disturbance would allow more opportunity for the spread of existing infestations of invasive non-native species. Second, the plans in this group are proposing the use and development of new miner-created temporary access roads that have not previously existed. Roadways and vehicle travel are one of the key factors that lead to increased risk of spread of invasive infestations. Generally, the more roads, access, and use equates to higher likelihood of increased spread of existing invasive sites. Third, the existence of high priority invasives would increase the risk of spread. The higher priority invasives generally have a much higher likelihood of spread. This increase in spread rate is due to higher fecundity and vegetative reproduction rates. The proximity of current sites would increase the risk of spread into newly-disturbed areas. For these reasons, the Plans listed in this group are estimated to have a potentially high effect on the establishment of invasive non-native species as compared to the moderate effect group.

Cumulative Effects of Proposed Mining Activities in Alternative 2

This section will examine the cumulative effects on the potential establishment of non-native plants as a result of proposed activities. For a specific description of other activities within the analysis area (Granite Creek Watershed), see Table 3-45 below. The information in Table is followed by a more in-depth description of the cumulative effects within the Granite Mining analysis area. Activities, past, present, and reasonably foreseeable future, may present increased risks for non-native plant establishment within

the project area. These activities have influenced vegetation and habitat throughout the project area and have created favorable situations for non-native plants to proliferate.

Table 3-45: Cumulative effects for the potential establishment of invasive non-native species within the Granite Mining Analysis Area.

Project	Potential Effects	Overlap in:		Effect Intensity	Rationale
		Time	Space		
Bullrun Culverts, Blue Sky Mine Culvert, 10 cent culverts, Clear Creek road realignment, and Olive Creek road reconstruction	Increase in propagule pressure do to increased access and movement of heavy equipment.	Yes	Yes	Moderate	This project will increase the use of heavy equipment and create some small areas of new ground disturbance. The use of common mitigations (i.e. avoid known infestations, clean equipment prior to use on NFS lands) for the project will keep the effect intensity down to a moderate rating.
Notice Level Mining (including suction dredging)	Increase in propagule pressure and bare ground	Yes	Yes	Low	The threat, however low, exists for the introduction of invasive plants through the movement of seeds on individual users. Seeds attached to tools, clothes or equipment could be moved to novel habitats.
Dispersed Recreation	Movement and introduction of invasive plant material	Yes	Yes	Low	Minimal risks involved with dispersed camping due to the movement and spread of invasive plant material by people and equipment. This risk is further minimized by a focused treatment of invasive plants in and around camping and gathering areas.

Project	Potential Effects	Overlap in:		Effect Intensity	Rationale
		Time	Space		
Prescribed Fire and Fuels Reduction (Granite WUI and 10 Cent Fuels)	Increase in disturbance and short-term reduction in competition	Yes	Yes	Moderate	Prescribed burning has the potential to increase disturbance, thus favoring invasive non-native plants. The short-term reduction in fuels may also reduce competition of native plants allowing the spread of the non-native plants. The burning could however, reduce the cover of the invasive plants all ready in place and retard seed set, and in conjunction with ongoing treatment, allow native plants to establish.
Large Fires and Wildfire Suppression	Large scale disturbance and introduction of seeds and other plant material	Yes	Yes	High	The extreme size and temperatures of wildfire can create optimal locations for invasive plant establishment. The removal of native vegetation coupled with the speed of movement of non-native plants creates ideal invasion conditions. Introduction of weedy material is also a risk during suppression operations due to the movement of equipment, engines, aircraft, etc.
Invasive Species Management	Prevention or reduction in introduction and spread of noxious weeds.	Yes	Yes	Moderate (Positive)	This activity should have a positive effect on the spread and establishment of invasive species by reducing the current extent of sites already found in the project area, and by minimizing the opportunity for new sites and species to establish

Project	Potential Effects	Overlap in:		Effect Intensity	Rationale
		Time	Space		
Developed Recreation (incl. Campgrounds, trailheads, rentals)	Movement and introduction of invasive plant material	Yes	Yes	Low	Minimal risks involved with dispersed camping due to the movement and spread of invasive plant material by people and equipment. This risk is further minimized by a focused treatment of invasive plants in and around camping and gathering areas.
Private Land activities (incl. Cabins, Residences, Timber harvest)	Ground disturbance or transportation of non-native plant material	Yes	Yes	Moderate	Activities on private ground have the potential to increase disturbance thus favoring invasive non-native plants. The establishment of invasive non-native plants on private ground could then increase the risk of movement and establishment within the project area. The unregulated nature of many private land activities increases the potential intensity of this effect.

The above activities, as outlined in the table, coupled with specific project activities can create situations for increased risk of introduction of non-native plant material. Ongoing treatments of non-native species help to mitigate the risks posed by management activities. Treatment continues on an annual basis within previously inventoried invasive sites.

Wildfire, combined with project activities, has the greatest chance for cumulative effects on non-native plants within the Granite Mining project area, but predicting wildfire occurrence is difficult. Large scale and intense wildfire disturbance would create ideal areas for the introduction and spread of non-native plants. With increasing numbers of wildfires the numbers of non-native species could increase (Merriam, et al., 2006), with the largest increases found in those areas with pre-existing non-native plant populations.

Of the activities with predictable timetables, roads and fuels treatments have the highest possibility of cumulative effects within the project area. Roads are a vector of weed spread and transport, thus unregulated road use, use of miner-created temporary roads, and use of closed Forest Service roads increases the risk. Travel management decisions (expected in the future on the Wallowa-Whitman National Forest) should reduce this risk by ending unregulated road use and cross-country vehicle traffic. Fuels treatments have the potential to increase disturbance, thus favoring invasive non-native plants. The

short-term reduction in fuels may also reduce competition of native plants allowing the spread of the non-native plants.

The Plans as proposed under Alternative 2 however, do not comply with all management direction. Specifically, the alternative would not meet the direction as outlined in the WWNF and Umatilla Forest Plans as amended by the Region 6 Invasive Plant Program ROD. Without complying with the regional standards (from above #1, 2, 3, 7, 8, and 13), this alternative would not be compliant with approved management direction.

Alternative 3

Direct and Indirect Effects of Proposed Mining Activities

Unlike Alternative 2, under this alternative, additional Forest Service BMPs would be added to the Plans of Operations for protection of water resources, fisheries, soils and other resources. These BMPs include: General Requirements (Appendix 2), Site-Specific Water Resource Protection Measures (WRPMs) (Appendix 1A), and other protection measures and monitoring, all of which are described in Chapter 2.

Potential Establishment of Invasive Non-native Species

The direct and indirect effects in terms of magnitude, extent, duration, direction, and speed on the potential establishment of invasive non-native species for Alternative 3 are discussed below. The effects when combined with certain General Requirements and mitigations are less impactful under Alternative 3 than Alternative 2. Specific effects are discussed below, but generally each Plan, when coupled with the General Requirements and mitigations, would have one entire effect level less than that outlined under Alternative 2 (i.e. from Moderate to Low or Low to No effect). After consideration and analysis of each Plan, this analysis will group similar operations together. This grouping is based on expected effects and impacts to the invasive non-native species, new road construction, size of annual disturbance (identified as cubic yards removed per day), type and size of invasive species within the site, and proximity to other invasive non-native species.

- **Low Effect Plans:** There are 24 Plans that pose a low effect for the potential establishment of invasive non-native species under Alternative 3. These plans are Altona, Belvedear, Bunch Bucket, City Limits, Lucky Strike Placer/Mill, Olive Tone, Royal White Group, Sunshine/McWillis, Ruby Group, Yellow Gold, Yellow Jacket, Tetra Group Lode/Mill, L&H, Muffin, Eddy Shipman, Blue Sky/Bull Run, Blue Smoke, Grubsteak, Hopeful 2&3, Little Cross 1, Make It, Old Eric 1&2, Rose Bud 1-4, and Hopeful. These sites were identified as moderate effect Plans under Alternative 2. These sites all have either no invasive non-native species within the ¼ mile buffer or have low-priority low-risk species. Each of the 24 above Plans are also proposing relatively little annual ground disturbance. The amount of ground disturbance on these claims would be less than 5 cubic yards/day of operation.

The potential effect of establishment of new invasive non-native plants within previously un-infested areas is estimated to be low under Alternative 3. With mitigations and General Requirements under this alternative, the greatest risk would be the establishment through introduction and movement of propagules on heavy equipment used for the mining activity. General requirement IS2 would mitigate this effect by requiring the pre-cleaning of all equipment used outside of the road prism. Further, all soil left stockpiled and any areas replanted must follow general requirements IS6, R7, and R12. These requirements would require the miner to mechanically treat invasive non-native species as they occur on stockpiled soil and cover those piles with mulch, which would reduce the growth and

establishment of invasive non-native species. Any seeding conducted must use certified weed-free seed to ensure that no establishment of invasives occurs from seeding activities during reclamation operations. The General Requirements, the low-priority low-risk species present, the location of these infestations, and the use of existing temporary mine access roads would keep the potential effect of establishment low for these Plans.

- **Moderate Effect Plans:** There are 4 plans of operation that pose a moderate effect for the potential establishment of invasive non-native species under Alternative 3. These plans are Tetra Alpha Placer, East Ten Cent, Troy D, and Lightning Creek, and were identified as high effect Plans under Alternative 2. These sites have larger infestations of higher priority invasive non-native species within the site and within the ¼ mile buffer, have proposed new miner-created temporary access roads, and are proposing larger scale ground disturbance as measured in cubic yards/day. The Plans in this group propose to process more than 20 cubic yards/day.

The effect for the establishment of invasive non-native species under Alternative 3 for the 5 Plans mentioned above is moderate. The moderate effect conclusion was reached due to multiple factors. First, all of these Plans are proposing to have larger scale ground disturbance than the other Plans in this project. More ground disturbance would allow more opportunity for establishment of invasive non-native species. Second, the Plans in this group are proposing the use and development of new temporary miner-created access roads that have not previously existed. Roadways and vehicle travel are one of the key factors to consider when analyzing the potential establishment. Generally, the more roads and access, the higher the likelihood of establishment of new invasive sites. Third, the existence of already identified invasive non-native species sites increases the risk of further establishment. General Requirement IS2 would mitigate this effect by requiring the pre-cleaning of all equipment used outside of the road prism. Further, all soil left stockpiled and any areas replanted must follow General Requirements IS6, R7 and R12. These requirements require the miner to mechanically treat invasive non-native species as they occur on stockpiled soil and cover these piles with mulch, which would reduce the potential growth and establishment of invasive non-native species. Any seeding conducted must use certified weed-free seed to ensure that no establishment of invasives occur from seeding during reclamation operations. The General Requirements, the low-priority low-risk species present, the location of these infestations, and the use of existing temporary mine access roads, would reduce the effect of establishment from high (under Alternative 2) to moderate for these Plans.

Potential Spread of Invasive Non-native Species

The direct and indirect effects in terms of magnitude, extent, duration, direction, and speed on the potential spread of invasive non-native species for Alternative 3 are discussed below. The effects, when combined with certain General Requirements and mitigations, are less impactful under Alternative 3 than Alternative 2. Specific effects are discussed below, but generally each Plan, when coupled with the General Requirements and mitigations, would have one entire effect level less than that outlined under Alternative 2 (i.e. from Moderate to Low or Low to No effect). After consideration and analysis of each Plan, this analysis will group similar operations together. This grouping is based on expected effects and impacts to the invasive non-native species, new miner-created temporary access roads, size of annual disturbance (identified as cubic yards removed per day), type and size of invasive species within the site, and proximity to other invasive non-native species. Any Plans identified as “no effect” for the spread of invasive species under Alternative 2 will not be discussed under Alternative 3 because the effects are the same under both alternatives.

- **Low Effect Plans:** There are 11 plans of operation that pose a low effect to the potential spread of invasive non-native species. These plans are Tetra Group Lode/Mill, Eddy Shipman, Blue sky/Bullrun, Blue Smoke, Grubsteak, Hopeful 2&3, Little Cross 1, Make It, Old Eric 1&2, Rose Bud 1-4, and Hopeful 1. These sites all have infestations of invasive non-native species within the site or within the ¼ mile buffer, have no proposed miner-created temporary access roads, and are proposing smaller scale ground disturbance as measured in cubic yards/day. The Plans in this group propose to process less than 5 cubic yards/day.

The potential effect of spread of existing invasive non-native plants within the project area is estimated to be low under Alternative 3. With mitigations and General Requirements included in Alternative 3, the greatest risk to the spread of invasive non-native species is through the creation of bare ground and movement of propagules on heavy equipment used for the mining activity. General Requirement IS2 and IS5 would mitigate this effect by requiring the cleaning of all equipment prior to entry to NFS lands and the avoidance of pre-existing infestations on the mining sites while invasive non-native plants are in flower or seed. Further, all soil left stockpiled and any areas replanted must follow General Requirements IS6, R7 and R12. These requirements require the miner to mechanically treat invasive non-native species as they occur on stockpiled soil and cover these piles with mulch, which would reduce the potential growth and spread of invasive non-native species. The General Requirements, the low-priority low-risk species present, the location of these infestations, and the use of existing temporary mine access roads, would keep the effect of establishment low on all of these Plans.

- **Moderate Effect Plans:** There are 4 Plans that pose a moderate effect for the potential spread of invasive non-native species. These Plans are Tetra Alpha Placer, East Ten Cent, Troy D, and Lightning Creek. These sites all have larger infestations of higher priority invasive non-native species within the site and within the ¼ mile buffer surrounding each site, have proposed development of new miner-created temporary access roads, and are proposing larger scale ground disturbance as measured in cubic yards/day. The Plans in this group propose to process more than 20 cubic yards/day.

The effect for spread of invasive non-native species under Alternative 3 for the 5 Plans mentioned above is moderate. The moderate effect conclusion was reached due to the effect from the General Requirements and mitigations included in Alternative 3, on multiple factors. First, all of these Plans are proposing to have larger scale ground disturbance than the other Plans in this project. More ground disturbance would allow more opportunity for the spread of existing infestations of invasive non-native species. Second, the Plans in this group are proposing the use and development of new temporary mine access roads that have not previously existed. Roadways and vehicle travel are one of the key factors that lead to increased risk of spread of invasive infestations. Generally, the more roads, access, and use equates to a higher likelihood of increased spread of existing invasive sites. Third, the existence of high priority invasives would increase the risk of spread. The higher priority invasives generally have a much higher likelihood of spread. This increase in spread rate is due to higher fecundity and vegetative reproduction rates. The proximity of current sites would increase the risk of spread into newly disturbed areas. However, General Requirement IS2 and IS5 would mitigate this effect by requiring the cleaning of all equipment prior to entry into NFS lands and that all ground disturbing activities avoid the known invasive non-native infestations while in flower or seed to reduce the spread of these sites. Further, all soil left stockpiled and any areas replanted must follow General Requirements IS6, R7 and R12. These requirements require the miner to mechanically treat invasive non-native species as they occur on stockpiled soil and cover these piles with mulch that should reduce the growth

and establishment of invasive non-native species. The General Requirements, the higher priority species present, the location of these infestations, and the use of existing temporary mine access roads would reduce the effect of establishment from high (under Alternative 2) to moderate for all of these Plans.

Cumulative Effects of Proposed Mining Activities in Alternative 3

This section will examine the cumulative effects on the potential establishment of non-native plants as a result of proposed activities. For a specific description of other activities within the analysis area, see Table 3-46 below. The information in Table 3-46 is followed by a more in-depth description of the cumulative effects within the Granite Mining project area. Activities, past, present, and reasonably foreseeable future, may present increased risks to non-native plant establishment within the project area. These activities have influenced vegetation and habitat throughout the project area and have created favorable situations for non-native plants to proliferate.

Table 3-46: Cumulative effects for the potential establishment of invasive non-native species within the Granite Mining Analysis Area.

Project	Potential Effects	Overlap in:		Effect Intensity	Rationale
		Time	Space		
Bullrun Culverts, Blue Sky Mine Culvert, 10 cent culverts, Clear Creek road realignment, and Olive Creek Road reconstruction	Increase in propagule pressure do to increased access and movement of heavy equipment.	Yes	Yes	Low	This project will increase the use of heavy equipment and create some small areas of new ground disturbance. The use of common mitigations (i.e. avoid known infestations, clean equipment prior to use on NFS lands) for the project will keep the effect intensity down to a moderate rating. General Requirement IS2, which requires the cleaning of all equipment prior to movement into the project area, would reduce this potential effect when compared to Alternative 2.

Project	Potential Effects	Overlap in:		Effect Intensity	Rationale
		Time	Space		
Notice Level Mining (including suction dredging)	Increase in propagule pressure and bare ground	Yes	Yes	Low	The threat, however low, exists for the introduction of invasive plants through the movement of seeds on individual users. Seeds attached to tools, clothes or equipment could be moved to novel habitats.
Dispersed Recreation	Movement and introduction of invasive plant material	Yes	Yes	Low	Minimal risks involved with dispersed camping due to the movement and spread of invasive plant material by people and equipment. This risk is further minimized by a focused treatment of invasive plants in and around camping and gathering areas.
Prescribed Fire and Fuels Reduction (Granite WUI and 10 Cent Fuels)	Increase in disturbance and short-term reduction in competition	Yes	Yes	Moderate	Prescribed burning has the potential to increase disturbance thus favoring invasive non-native plants. The short-term reduction in fuels may also reduce competition of native plants allowing the spread of the non-native plants. The burning could however, reduce the cover of the invasive plants all ready in place and retard seed set, and in conjunction with ongoing treatment allow native plants to establish.

Project	Potential Effects	Overlap in:		Effect Intensity	Rationale
		Time	Space		
Large Fires and Wildfire Suppression	Large scale disturbance and introduction of seeds and other plant material	Yes	Yes	High	The extreme size and temperatures of wildfire can create optimal locations for invasive plant establishment. The removal of native vegetation, coupled with the speed of movement of non-native plants, creates ideal invasion conditions. Introduction of weedy material is also a risk during suppression operations due to the movement of equipment, engines, aircraft, etc.
Developed Recreation (incl. Campgrounds, trailheads, rentals)	Movement and introduction of invasive plant material	Yes	Yes	Low	Minimal risks involved with dispersed camping due to the movement and spread of invasive plant material by people and equipment. This risk is further minimized by a focused treatment of invasive plants in and around camping and gathering areas.
Private Land activities (incl. Cabins, Residences, Timber harvest)	Ground disturbance or transportation of non-native plant material	Yes	Yes	Moderate	Activities on private ground have the potential to increase disturbance, thus favoring invasive non-native plants. The establishment of invasive non-native plants on private ground could then increase the risk of movement and establishment within the project area. The unregulated nature of many private land activities increases the potential intensity of this effect.

The above activities, as outlined in the table above, coupled with specific project activities could create situations for increased risk of introduction of non-native plant material. Ongoing treatments of non-

native species help to mitigate the risks posed by management activities. Treatment continues on an annual basis within previously inventoried invasive sites.

Wildfire combined with project activities has the greatest chance for cumulative effects on non-native plants within the Granite Mining project area, but predicting wildfire occurrence is difficult. Large scale and intense wildfire disturbance would create ideal areas for the introduction and spread of non-native plants. With increasing numbers of wildfires the numbers of non-native species could increase (Merriam, et al., 2006), with the largest increases found in those areas with pre-existing non-native plant populations.

Of the activities with predictable timetables roads and fuels treatments have the highest possibility of cumulative effects within the project area. Roads are a vector of weed spread and transport, thus unregulated road use, use of miner-created temporary roads, and use of Forest Service closed roads increases the risk. Travel management decisions (expected in the future on the Wallowa-Whitman National Forest) should reduce this risk by ending unregulated road use and cross-country vehicle traffic.

The Plans as proposed under Alternative 3 do comply with all management direction by meeting the requirements of the WWNF and UNF Forest Plans and all amendments, including the standards and guidelines found in the Region 6 Invasive Plant ROD (USDA 2005).

Summary of Effects Analysis

The effects found in the above analysis can manifest in a variety of ways depending on the alternative. Each alternative has its own risks and effects that would be expected from project activities.

As stated earlier, Alternative 1 would have no new effects due to project activities within the project boundary. However, continuing risks would exist from other types of activities occurring in the analysis area, and invasive non-native species would continue to spread and establish at the 4-6 percent mentioned previously.

Although risks are present with or without project activities, the danger of invasive species spread due to project activities under Alternatives 2 and 3 would increase when compared to Alternative 1. With implementation of project design features to reduce and control the introduction and spread of non-native species, the impacts that do exist would be minimized, and effects under Alternative 3 would be less than Alternative 2. The lack of specific mitigations and required standards under Alternative 2 would increase the chances of new introductions, spread, and establishment of invasive non-native plants, spread and establishment rates would be expected at or above the natural predicted rate. Even with the presence of ongoing treatments, the rate of spread and establishment could be higher than 8-12 percent per year. With implementation of project design features to reduce and control the introduction and spread of non-native species, the impacts that do exist would be minimized. Specific mitigations and required standards included in Alternative 3 would reduce the chances of new introductions, spread, and establishment of invasive non-native plants, and spread and establishment rates would be expected at the upper end of the natural level or about 6-8 percent (Table 3-47).

Table 3-47: Summary of estimated effects under all alternatives in the Granite Mining Projects on invasive non-native species.

Est. Effect*	No-Action	Alt. 2	Alt. 3
Establishment Potential	-	--	--
Spread Potential	-	--	--

* Estimated effect is based on increases (from pre-project levels) in establishment and spread of invasive non-native species due to project level activities. More -'s equate to higher risk.

Climate Change (Direct/Indirect and Cumulative Effects)

The potential effects of climate change on invasive species are unclear. Studies have suggested that climate change could favor invasion by non-native plants, while others have found that some species may actually be reduced as a result of potential climate change effects (Bradley, et. al, 2009; Hellman, et. al, 2008). It is safe to assume however, that invasions by non-native species would still be a concern.

With the unknown extent of climate change and the potential effect on non-native species, it is difficult to analyze the effects of climate change on invasive species in the Granite mining project. However, due to the mitigations and General Requirements under Alternative 3, it seems un-likely that the activities of this project, when coupled with climate change, would increase the risk of invasion of the Granite Mining project area beyond that outlined under Alternative 3. Because the mitigations and General Requirements are not included in Alternative 2, there would be a slight increase in the potential for any increased impact on native species from climate change.

Compliance with the Forest Plan and Other Direction

The Forest Plan (as amended by the 2005 Region 6 ROD, amendment #RF5) provides direction for the control of noxious weeds and other competing vegetation where such activities are not precluded by management area direction. The goals focus on maintaining or enhancing ecosystem function to provide for long-term integrity and productivity of biological communities, treatment of priority infestations, and monitoring the effects of all activities to reduce the impacts of non-native plants. The site specific treatment requirements are further amended by the Wallowa-Whitman National Forest Invasive Plant Treatment Program EIS and Umatilla National Forest Invasive Plant Treatment Program EIS (USDA 2010). The Granite Mining Project under Alternative 3 is consistent with these goals, standards, and guidelines through adherence to the EIS and the Forest Plan's. However, Alternative 2, which does not require the adherence to applicable standards would not meet the requirements set out in the WWNF and Umatilla Forest Plans, and therefore does not meet compliance of management direction.

This page intentionally left blank.

Botany

Introduction

Botanical resources refer to those vascular or non-vascular taxa that have been assigned special status as either Threatened or Endangered via federal Endangered Species Act (ESA) designation or as Sensitive by the Region 6 Regional Forester.

This analysis is also the Biological Evaluation (BE), which analyzes effects or impacts from the action alternatives to plants listed as federally Threatened or Endangered (TE), or proposed for listing, and Forest Service Sensitive (S) plant species. The plants considered in this analysis are listed on the RFSSSL (Regional Forester's Special Status Species List) as updated in December 2011 (<http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/>). This list includes all TES plant species in Region 6.

This analysis is the means of conducting the review and documenting the findings (FSM 2672.4). The objectives of this analysis are to:

- 1) ensure that Forest Service actions do not contribute to the loss of viability of any native or desired non-native plant species at the individual National Forest level or contribute to trends toward Federal listing of any species;
- 2) comply with the requirements of the Endangered Species Act that actions of Federal agencies not jeopardize or adversely modify critical habitat of Federally listed species;
- 3) provide a process and standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision making process
- 4) demonstrate compliance with the Umatilla and Wallowa-Whitman National Forest Plans, and other laws, regulations and policies relative to protection of TES plant species.

Scale of Analysis

The analysis area for this resource was limited to the proposed project areas as described in the Plan of Operations as submitted to the Forest Service for the Granite Creek Watershed Mining EIS, hereafter referred to as the Granite Mining EIS and the project area.

Summary of Determinations

Federally Listed Plant Species

Within the confines of the various mining areas as described in the proposed Plans of Operations covered under the Granite Mining EIS there are no known populations of any federally threatened or endangered plant species listed under the auspices of the Endangered Species Act (ESA).

Silene spaldingii – Spalding's catchfly – is Federally-Listed as Threatened under the Endangered Species Act and is known to occur on the Umatilla and Wallowa-Whitman National Forests. The action

alternatives would have **No Effect** on *Silene spaldingii*. *Silene spaldingii* occurs primarily in open grasslands on deep loess-derived Palousian soils. All known occurrences of the species are many miles distant from the proposed activities. There is no suitable habitat within any of the proposed activity areas for *Silene spaldingii*.

Mirabilis macfarlanei – Macfarlane’s four-o-clock – is also Federally-Listed as Threatened under the Endangered Species Act. The species is known to occur on the Wallowa-Whitman National Forest in the Hells Canyon National Recreation Area in Wallowa County. It also occurs on the Cottonwood District of Bureau of Land Management land holdings in Idaho County, Idaho. The action alternatives would have **No Effect** on *Mirabilis macfarlanei*. *Mirabilis macfarlanei* is strictly confined to lower elevation reaches of the Hells Canyon area and is not to be expected within the geographic area as all known occurrences of the species are many miles distant from the proposed actions. The proposed activities would comply with present Federal regulations pertaining to the management of Threatened, Endangered, and Sensitive plant species.

Sensitive plant species

No plant species presently listed by the Region 6 Forester as sensitive were found during the course of conducting comprehensive surveys of the mining claims covered by this EIS. Therefore, the action alternatives would have **No Impact** on any listed sensitive plants. However, see the discussion below regarding the very rare, but not presently listed, spider biscuitroot – *Lomatium tarantuloides*.

A list of R6 sensitive, and strategic, plant species that were thought to have potential for occurrence at the proposed mining sites is presented in Table 3-50 later in this section.

Table 3-48: Effects Determinations Spectrum (Sensitive Species)

NI	No Impact
MIH	May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
WIFV	Will Impact Habitat or Individuals with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

Existing Conditions

In preparing this analysis, botanical surveys conducted in the project area were reviewed in the Natural Resource Inventory System (NRIS) Threatened Endangered Sensitive Species/Invasive Species (TESP/IS) database. In addition, a pre-field review of potential special status plants was assembled as a guidance tool for directing field efforts.

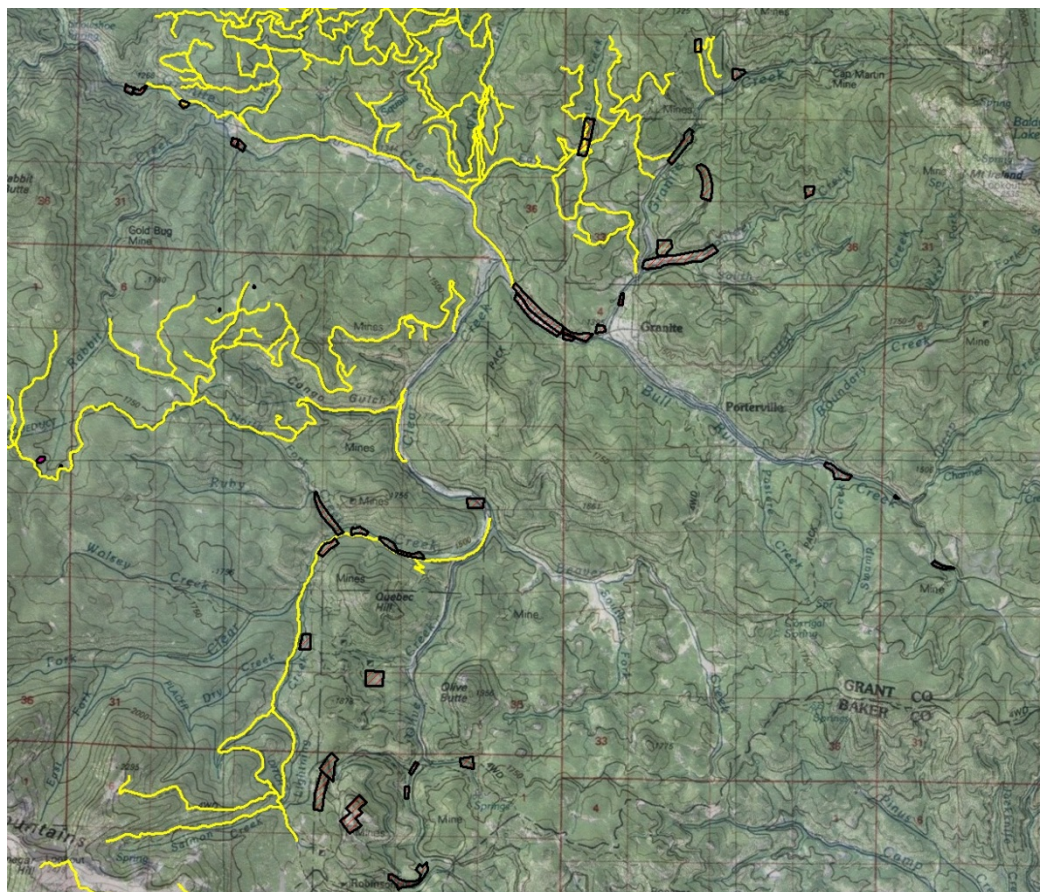


Figure 1: Granite Mining EIS Claim Locations.

Table 3-49: Granite Mining EIS Project Names / National Forest / Survey / Sensitive Species Synopsis

Project Name/Forest	Botanical Survey Type	RFSSSL Species & Species of Interest Presence/Absence
Altona WWNF	not visited	none
Belvedere Group WWNF	complete species	none
Blue Sky/Bull Run WWNF	complete species	none
Blue Smoke	not visited	----
Bunch Bucket UMA	not visited	-----
City Limits WWNF	not visited	-----
East Ten Cent UMA	complete species	none
Eddy Shipman UMA & WWNF	not visited	-----
Grubsteak UMA	complete species	none

Project Name/Forest	Botanical Survey Type	RFSSSL Species & Species of Interest Presence/Absence
Hopeful 1 UMA	complete species	none
Hopeful 2&3 UMA	complete species	none
L&H	complete species	none
Lightning Creek UMA	complete species	none
Little Cross 1 WWNF	not visited	-----
Lucky Strike UMA & WWNF	complete species	none
M&L WWNF	not visited	-----
Make it WWNF	not visited	-----
Muffin WWNF	targeted	none
Old Eric 1&2 UMA	not visited	-----
Olive Tone WWNF	not visited	-----
Rose Bud 1-4 UMA	complete species	none
Royal White Group WWNF	complete species	<i>Lomatium tarantuloides</i>
Ruby Group UMA	complete species	none
Sunshine Group WWNF	complete species	none
Tetra Group WWNF	complete species	none
Troy D WWNF	targeted	-----
Yellow Gold WWNF	complete species	none
Yellow Jacket WWNF	not visited	-----

UMA = Umatilla N.F. / WWNF = Wallowa-Whitman N.F.

Targeted = additional survey conducted June 20, 2013.

Table 3-50: Review of Sensitive Sensitive Species With Potential To Occur On Granite Mining EIS Sites.

Species	Habitat	Status	Likelihood of Occurrence	Populations Found / Number
<i>Botrychium ascendens</i>	moist areas	sensitive	low	none
<i>Botrychium crenulatum</i>	moist areas	sensitive	moderate	none
<i>Botrychium hesperium</i>	moist areas	sensitive	low	none

<i>Botrychium lineare</i>	moist areas	sensitive	low	none
<i>Botrychium lunaria</i>	moist areas	sensitive	low	none
<i>Botrychium montanum</i>	moist areas with spruce	sensitive	moderate	none
<i>Botrychium paradoxum</i>	moist areas	sensitive	low	none
<i>Botrychium pedunculosum</i>	moist areas	sensitive	low	none
<i>Carex cordillerana</i>	moist areas / riparian	sensitive	moderate	none
<i>Carex lasiocarpa</i>	seasonally moist meadows	sensitive	low	none
<i>Carex saxatilis</i>	fens	sensitive	low	none
<i>Gentianella propinqua</i>	seasonally moist meadows	will be sensitive on next R6 list cycle	low	none
<i>Listera borealis</i>	serpentine fens	sensitive	moderate	none
<i>Lomatium erythrocarpum</i>	rocky south exposures at higher elevations	sensitive	low	none
<i>Lomatium tarantuloides</i>	gravelly serpentine substrates	sensitive on future R6 list cycle	moderate	yes – 1
<i>Phacelia minutissima</i>	seasonally moist / bare soil	sensitive	low	none
<i>Swertia perennis</i>	moist forested sites	strategic	moderate	none
<i>Utricularia minor</i>	still fresh water ponds	sensitive	moderate	none

Botanical Surveys

Botanical surveys for RFSSSL vascular and non-vascular plant species were conducted in support of the Granite Mining EIS on the 27th and 29th of July, 2010, and again in 2011 on the 9th and 10th of August, 2011. An additional targeted survey was conducted by Forest Service botanists on the 20th of June 2013. This later additional survey was specifically conducted to address the possible occurrence of the very rare biscuitroot species *Lomatium tarantuloides* within the footprint of the proposed Plan of Operations for the Royal White lode mining claim.

A representative subset of the full suite of sites in the proposed action was visited. For most of the mining claim sites visited a running tally of all the vascular plant species encountered was kept (see Table 3-49 above). A synoptic species lists is presented below in Table 4. A comprehensive list of non-vascular species and lichens was not kept, as surveys were specifically only of a targeted nature for sensitive taxa in these groups.

Attention was also paid to the possible presence of populations of First Foods. This suite of plant species are of cultural importance to the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). Traditional use plants are also important to the Confederated Tribes of Warm Springs (CTWS) and Nez Perce Tribe. Efforts to address their presence and population status on Forest Service lands on a broad scale are ongoing. An evaluation of their presence on the proposed mining claim sites has been submitted as a separate document to the respective forest cultural resource programs.

Several of the visited mining claim sites were, upon evaluation, considered to be so heavily impacted by past mining activities, including historical dredge tailings, that surveys were quickly conducted with no attempt to search the area for common species not encountered previously. Table 3-49 makes the distinction between two types of survey evaluations as either ‘complete species’ or ‘targeted’.

The survey methodology employed was the standard ‘intuitively guided technique’ wherein all habitats and settings in a given area are investigated so as to provide as complete a biodiversity assessment of an area as possible within the allotted time. Surveys were also conducted at phenologically appropriate times during the field season so as to maximize the probability of encountering the greatest number of species possible.

The large majority of the mining claim sites were, as was expected, were disturbed by previous mining activities. In all cases the potential for discovery of hitherto unknown populations of RFSSSL species was considered to be fairly low. Several of the mining claim sites – 11 in total; see Table 3-49 – were not visited at all based upon prior knowledge of the depauperate condition of existing vegetation site conditions. However, it was also recognized that a few of the mining claims included relatively intact wetland sites. Additionally, a few of the claims are situated on geologic substrates of ultramafic affinity. Rocks of this type – serpentine and peridotite in particular – are well-known worldwide to often harbor unusual, and frequently very rare, narrow endemic plant species. In this regard claims that included these features were given particularly strong scrutiny.

Results

The surveys did not result in the discovery of any vascular plant, non-vascular plant or lichen species on the present iteration of the RFSSSL. As discussed below there is however one proposed site that is of botanical interest and deserves discussion accordingly – the Royal White Group claim.

Royal White Group

The Royal White Group site is a lode-mining operation that is approximately 10-acres in size. Mining activities are confined to underground excavations and associated activities near the active adit entrance. The claim is located in a large block of serpentine.

Surveys at the site in late July of 2011 resulted in the discovery of a small population of the then ‘strategic species’ Bolander’s bluegrass – *Poa bolanderi* at the west margin of the claimed area. This annual grass species was recently added to the R6 strategic list. However, the species has since been recommended for delisting as of the last rare plant meeting (October 2012) of the Oregon Biodiversity Information Center

(ORBIC). It is anticipated that this plant will not be of concern relative to the proposed plan of operations for the Royal White Group.

However, based upon habitat characteristics at the Royal White site, a second species of conservation concern – *Lomatium tarantuloides* – spider biscuitroot – was recognized as having significant potential of occurring on the site. The July surveys in 2011 were conducted too late in the field season to determine if the species was indeed present or not. A relatively nearby discovery of this as yet undescribed species in early July of 2011 suggested the likely presence of the plant at the Royal White site.

The rare plant species *Lomatium tarantuloides* was recently published (Darrach and Hinchliff 2014). This member of the carrot family (Apiaceae) is now known from several localities in the Greenhorn Mountains and is restricted to gently sloping gravelly serpentine substrates. The species is presently recognized as rare by the Oregon Natural Heritage Program (ORBIC), but will not be formally included on its published lists as a List 1 entity until the 2016 iteration of its tri-annual Rare Threatened and Endangered Species of Oregon. Formal listing of the species as sensitive on the RFSSSL will occur subsequent to the ORBIC listing.

On the 20th of June, 2013 Forest Service botanists revisited the Royal White group site and specifically assessed the area for the presence of *Lomatium tarantuloides*. The plant was found in great abundance on the edge and slightly into the project claim footprint (Figure 2). The population of plants is comprised of perhaps 2000 individuals in a dense contiguous patch on serpentine gravels that have, over time, apparently received persistent disturbance created by fossorial rodents – most probably *Thomomys talpoides*, the northern pocket gopher. As with some other *Lomatium* species (Darrach and Wagner 2011), it is surmised that this disturbance regime is a critical ecological element allowing *Lomatium tarantuloides* to persist on the landscape over time.

Protection Measures included in Alternative 3

2. To preclude the possibility of any severe damage (e.g. direct mechanical destruction of plants or soil compaction) to the population of *Lomatium tarantuloides* at the Royal White site by inadvertent forays into the area by mining equipment, the miner will not breach the area protected by fallen trees immediately adjacent to Forest Service Road 1042970 that transects the population. Prior to commencement of mining activities, the Forest Service will fall small trees or install another type of barrier around the area to be avoided and protected.

Effects Analysis

Direct Effects

Alternative 1 – No Action

The no action alternative would have no direct effect on rare plant resources because no Plans of Operations would be authorized for approval.

Alternative 2 –Proposed Action

The population of rare *Lomatium tarantuloides* located at the Royal White Group site (Figure 2) could be affected by mining activities. The proposed activities may lead to harming the viability of this population through such factors as soil compaction (e.g. vehicle traffic) or other incursions to the site that may be viewed as compromising the integrity of the population.

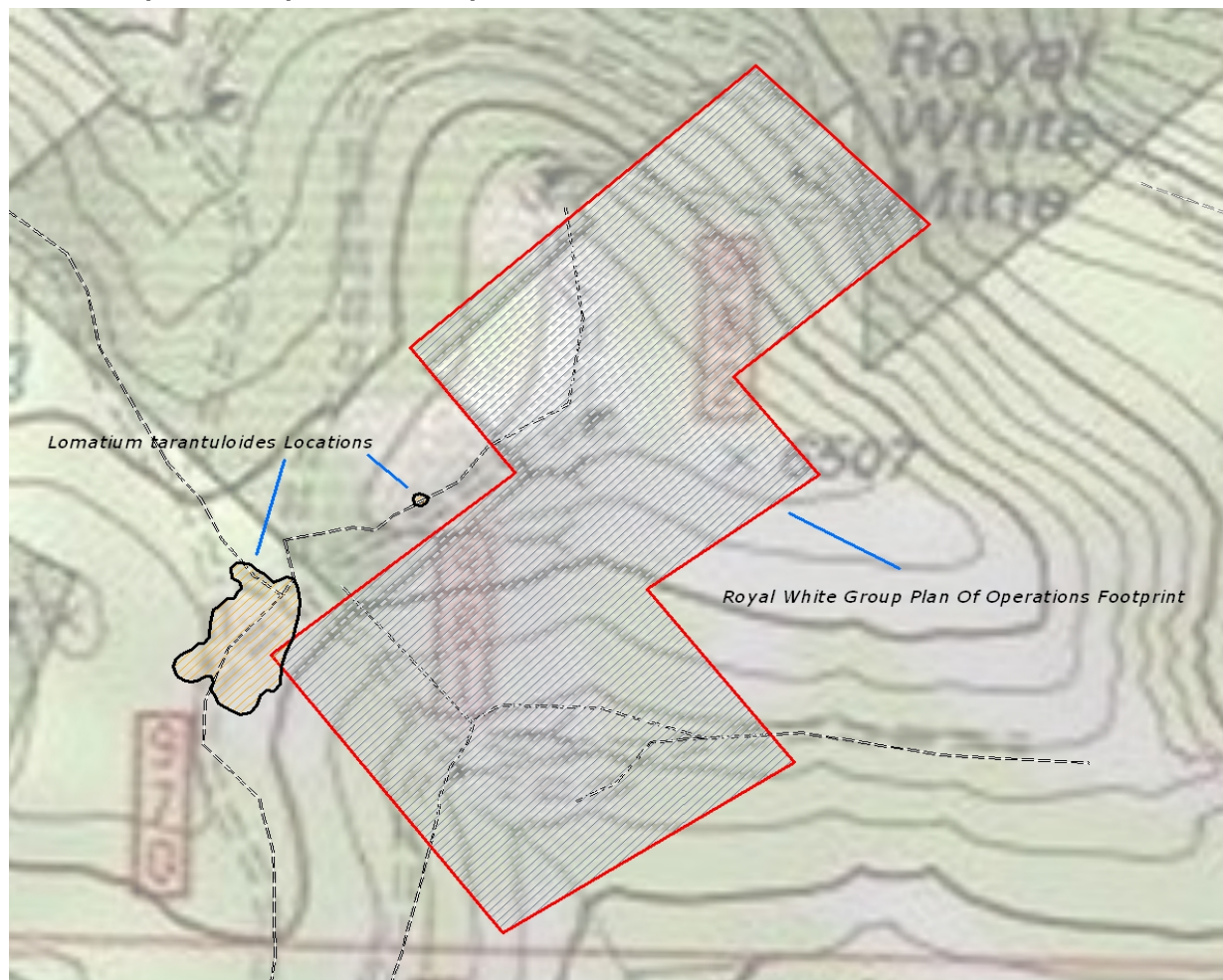
Alternative 3 – Proposed Action with Additional Forest Service Requirements

Under this alternative, Forest Service Requirements designed to protect and improve water quality, fish habitat, and surface and other resources would be incorporated into the Plans of Operations. The addition of Forest Service protection measures and requirements in this alternative, including the site-specific protection measure for *Lomatium tarantuloides* at the Royal White Group site, would prevent impacts to the single rare plant population at the Royal White Group lode claim.

Indirect Effects

Indirect effects to rare plant resources from Granite mining activities are addressed together in this section due to the similarity of effects. Only the Royal White Group mining claim harbors rare plants – *Lomatium tarantuloides*. The primary indirect effect to be considered is the impact invasive plant species may have on this population. At the present time there are not any significant invasive plant issues noted in the immediate area of this population. However, the apparent perpetual state of disturbance that characterizes the site predisposes the location to colonization by weedy invasive taxa. Mining activities may act as a vector to introduce non-native weeds to the locale. Fortunately, the serpentine substrate that characterizes the area is typically refractory to invasion by non-native species. Also, measures to prevent the potential invasion and spread of invasive species are incorporated into this alternative (Chapter 2, Monitoring, and Appendix 2 - General Requirements).

Figure2: Location of *Lomatium tarantuloides* population adjacent to and overlapping the Royal White Group Plan of Operations Footprint



Cumulative Effects under Alternative 2 and 3

The spatial scale of analysis for cumulative effects to TES plant species is the immediate Granite EIS area in the Granite Creek watershed. The temporal scale begins with the first European settlers in the area in the 1800's and ends approximately 30 years into the future or 2043. Past, present, and reasonably foreseeable future events in the Granite EIS can be expressed primarily as a conglomeration of 6 factors:

1. Historical ungulate grazing by domestic animals – both sheep and cattle

Domestic livestock grazing in the area is largely germane to the discussion as an historical legacy. Of particular note sheep grazing in the area was a major source of disturbance to vegetation in the past. Large sheep bands nearly completely denuded herbaceous cover from many areas in nearby subalpine settings. Ecological disclimax plant communities reflecting this intense period of unmanaged grazing persist to the present and can be expected to persist well into the future. It is likely that local rare plant resources were severely impacted. No grazing of domestic livestock

currently occurs within the Granite Creek Watershed, therefore, there would be no cumulative effects from domestic grazing going forward.

2. Ongoing soil and plant disturbances associated with the resident native ungulate populations

Native ungulate effects upon the landscape in and immediately adjacent to the area addressed in the Granite EIS are interpreted to have incurred minimal impacts. This statement pertains to the past, at the present time, and, as inferred, into the future timeline. This is not to say that native ungulates have not, are not, and will not have impacts. It is only meant to state that clear herbivory pressures are not apparent in influencing the trajectory of plant communities

3. Ongoing soil disturbances by fossorial rodents – particularly the northern pocket gopher *Thomomys talpoides*.

Fossorial rodents acting as a significant agent of soil disturbance in the area appears to be quite prevalent at the present time. Northern pocket gophers burrowing under winter snowpack are clearly a significant disturbance factor at the *Lomatium tarantuloides* site at the Royal White Group claim. As discussed above, they very likely play an important role in allowing the plants to persist in significant numbers. Past and future levels of burrowing rodent activity in the area are indeterminant. However climate change influences, discussed further below, may play a major influential role in depressing populations.

4. Disturbances associated with fires and fire-fighting efforts.

Fire as an agent of disturbance in the Granite EIS area is not well resolved. However it can be reasonably assumed that the historical fire regime in the area has been modified in the last 100 years as fire suppression has dominated management philosophy. Future fire effects to vegetation and rare plant resources are expected to become progressively more pronounced as recent climate modeling data largely indicate that future fire return intervals will be shorter and fire behavior may be more extreme.

5. Effects directly attributable to climate modification.

In addition to expected significant departures in fire return intervals and fire behavior discussed above, climate changes are predicted to have a pronounced effect on depth and duration of snow pack at higher elevations. These snow pack changes are anticipated to deleteriously change the setting in which rare plant resources reside in the Granite EIS area. The very rare *Lomatium tarantuloides* – spider biscuitroot – appears to be dependent upon a persistent disturbance regime provided primarily by the fossorial rodent *Thomomys talpoides* – the northern pocket gopher. This rodent species is well known for being very active during the winter months under snowpack, and the species exerts significant herbivory pressure on various plant species in this setting (Ingles 1949; Litaor et al. 2008; Stuebe and Anderson 1985; Darrach and Wagner 2011).

As impending predicted climate change becomes more pronounced with moderating winter temperatures and the associated expected reduced temporal presence of snow pack, it stands to reason that fossorial rodent populations may decline accordingly. The deleterious effects of the absence of a fossorial rodent disturbance regime on a population of a different recently described rare *Lomatium* species with similar ecological requirements to *Lomatium*

tarantuloides is probably predictive of an impending population decline to be expected for spider biscuitroot (Darrach and Wagner 2011).

Summary of Effects for Rare Plant Species from the Granite Mining EIS Alternatives

In summary, due to the direct, indirect, and cumulative effects from all the alternatives summarized in sections above for the one rare plant species – *Lomatium tarantuloides* - identified during the course of conducting on-the-ground botanical surveys the determination is ‘MIIH - May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species ’.

Consistency with Federal Regulations (ESA) and Forest Plans

The Forest Plans for the Umatilla and Wallowa-Whitman National Forest (1990) include the goal, ‘Maintain or improve habitats for all threatened and endangered plant and animal species on the Forest, and manage habitats for all sensitive species to prevent their becoming threatened or endangered.’ Under the National Forest Management Act, the population viability boundary stops at the Forest Boundary. Alternative 3, with the Forest Service protection measure for *Lomatium tarantuloides*, is consistent with both existing ESA regulations and the 1990 Forest Plans.

This page intentionally left blank.

Access/Transportation System _____

The Granite Creek Watershed Mining proposals would not add new Forest Service open roads to the watershed, and is therefore consistent with WWNF and UNF Forest Plan direction for access/transportation. A roads analysis conducted for this analysis can be found in the project file.

Affected Environment

Introduction

Mining Claim Access

Mining access is different from access needed or associated with other national forest uses. Federal regulations provide a mining miner reasonable access incident to their operations (refer to 36 CFR 228.12). As a part of this analysis, the access proposed for each operation was evaluated to determine which existing and proposed roads (Forest Service closed/decommissioned, and temporary miner-created), fords and bridges are reasonably incident to the operation, and to determine what BMPs, if any, are needed to approve or regulate construction, use, or maintenance of the roads, fords and bridges.

The following Table displays the access proposed under Alternatives 2 and 3.

This page intentionally left blank.

Table 3-51: Closed and Temporary Access Roads Proposed for use by Miners

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
Altona	1042E1a	1042E1c	1042E1b	0.56	Native	Temporary -E	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1042E1b	1042E1a	1042M1a	0.59	Native	Temporary -E	Y	Y	
	1042E1c	1305098	1042E1a	0.21	Native	Temporary -E	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1042M1a	1042E1b	Processing	0.05	Native	Temporary -P	Y	Y	Proposed
	1305098	1305092	1041E1c	0.20	Native	FS Closed	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1305099	1305080	1305092	0.30	Native	FS Closed	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1305092	1305099	1305098	0.03	Native	FS Closed	y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
Belvadear	1305-E2	1305080	Claim	0.15	Native	Temporary - E	Y	Y	
Blue Sky/Bull Run	7300-E4a	Co 24	7300-E4b	0.11	Native	Temporary -E	Y	Y	Existing Ford on bull run Access disperse campsite
	7300-E4b	7300-E4a	Processing	0.15	Native	Temporary -E	Y	Y	Existing Ford on Swamp Creek
	7300-E4c	7300-E4a	Site 2 Blue Sky	0.02	Tailings	Temporary -E	Y	Y	
	7300-M4a	7300-E4a	Site 3 Blue Sky	0.07	Native	Temporary -P	Y	Y	
	7300-M4b	Co 24	Site 2 Bull Run	0.07	Native	Temporary -P	Y	N	Proposed Temporary Bridge – In Alt 3, replaced with 7375-M1a because placement and removal of bridge would result in a discharge.
	7375-M1a	7375-	Site 1 Bull Run	0.05	Native	Temporary -E	Y	Y	Alt 3-gate during use

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
		000							
	7375-M1b	7375-M1a	Site 2 Bull Run	0.20	Native	Temporary-P	N	Y	Alt 3 only. Instead of bridge on 7300-M4b.
Blue Smoke	1000-E1a	1000000	Claim	0.46	Native	Temporary - E	Y	Y	Powerline Road,
Bunch Bucket	1310-E2a	1310000	Site 1	0.08	Aggregate	Temporary -E	Y	Y	Access dispersed campsite
	1310-E2b	Site1,2	Processing	0.09	Native	Temporary -E	Y	Y	
	1310-E2c	Proces- sing	Site 2	0.08	Native	Temporary -E	Y	Y	
City Limits	7300-E3a	7300000	Claim	0.11	Tailings	Temporary -E	Y	Y	
	7300-E3b	7300000	Claim	0.02	Tailings	Temporary -E	Y	Y	
East Ten Cent Creek	7350050	7350000	Claim	0.06	Aggregate	FS Closed	Y	Y	OHV Trail
	7350070	7350000	Claim	0.39	Aggregate	FS Closed	Y	Y	OHV Trail
	7350-E1a	7350070	Pond	0.12	Aggregate	Temporary -E	Y	Y	Miner Install new Gate
	7350-M1a	7350050	Shed	0.32	Native	Temporary -E	Y	Y	Miner Install new Gate
Eddy Shipman	7300590	7300000	7300-E1a	0.04	Native	FS Closed	Y	Y	Existing FS Gate
	7300680	7300000	7300-E1d	0.10	Native	FS Closed	Y	Y	Existing FS Barricade.
	7300-E1a	7300590	Cabin/Adit B	0.42	Native	Temporary -E	Y	Y	Old County Road
	7300-E1b	7300-E1a	7300-E1c	0.10	Native	Temporary -E	Y	Y	
	7300-E1d	7300680	Adit A	0.07	Native	Temporary -E	Y	Y	Existing ford, Olive Creek
Grubsteak	1300-M1a	Co 24	Dig Site	0.19	Native	Temporary -E	y	Y	Existing Miner's Bridge & Gate
Hopeful 1	1035-E2a	1035012	Cabin/Claim	0.17	Aggregate	Temporary - E	Y	Y	
	1035012	1035011	Claim	0.70	Aggregate	FS Closed	Y	Y	
Hopeful 2-3	1035-E1a	1035000	1035-E1b	0.21	Aggregate	Temporary -E	Y	Y	Old Road 1035-015
	1035-E1b	1035-E1a	1035-E1d/cabins	0.08	Aggregate	Temporary -E	Y	Y	
	1035-E1c	1035-E1a	1035-E1d/filter plant	0.27	Native	Temporary -E	Y	Y	Old Road 1035-015
	1035-E1d	1035-E1b	1035-E1c	0.19	Native	Temporary -E	Y	Y	Existing Ford (Alt 2 = 2) (alt 3 = 1) Granite Creek

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
L&H	1305-E5a	1042950	1305200	0.29	Native	Temporary - E	Y	Y	Continuation of Rd 950
	1305-E5b	1305200	Adit	0.06	Native	Temporary - E	Y	Y	
Lightning Creek	1305-E6a	1305100	Final Pond	0.07	Native	Temporary - E	Y	Y	
	1305-E6b	1305100	Dig Site	0.10	Native	Temporary - E	Y	Y	
Little Cross	1000-E3a	Co 24	Campsite	0.03	Tailings	Temporary - E	Y	Y	
Lucky Strike	Only using open FS roads								
Make-it	7300-E2a	7300700	Cabin	0.37	Native	Temporary - E	Y	y	Existing Miner's gate
Muffin	7355012	7355000	Claim	0.18	Native	FS Closed	Y	y	
	7355M1a	7355012	Work Site	0.08	Native	Temporary - E	Y	y	Existing - miner will rehab
Old Eric 1&2	10000-E2a	Co 24	Campsite	0.40	Tailings	Temporary - E	Y	y	Dispersed Camp site
Olive Tone	1305-E4a	1305082	1305-E4b	0.02	Native	Temporary - E	Y	y	
	1305-E4b	1305-E4A	Pond/Mining Site	0.16	Native and Tailings	Temporary - E	Y	y	Existing Ford on Olive Creek
Rosebud 1-4	1000-E1a	1000000	Claim	0.46	Native	Temporary - E	Y	Y	Powerline Road
Royal White	1042-E2a	Pvt Rd	Upper Adit	0.11	Native	Temporary - E	Y	Y	Extension of 1042-982
	1042-E2b	Pvt Rd	Mine Bldings	0.14	Native	Temporary - E	Y	Y	Behind existing private gate
	1042-E2c	1042982	Shafts	0.06	Native	Temporary - E	Y	Y	
Ruby Group	1310-E1a	1310000	Cabin/Sites 1,2,3	0.62	Native	Temporary - E	Y	Y	2 existing fords, (Clear & Ruby) Miner proposed ATV Bridge
	1310-E1b	1310-E1a	Site 2, staging area	0.03	Native	Temporary - E	Y	Y	
	1310-E3a	1310000	Site 4,5	0.07	Native	Temporary - E	Y	Y	
	1310-E3b	1310-E3a	Site 6	0.06	Native	Temporary - E	Y	Y	
	1310-E3c	1310-E3a	Site 7	0.02	Native	Temporary - E	Y	Y	
	1310-E4a	1310000	Site 8	0.09	Native	Temporary - E	Y	Y	
Sunshine/McWillis	1305054	1305050	1305-M1s	0.40	Native	FS Closed	Y	Y	

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
	1305-M1a	1305054	Claim site	0.18	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab Existing Miner's Bridge, McWillis
	1305130	1305120	Diversion Dam	0.45	Native	Decommissioned	Y	Y	Use as Temporary Road
Tetra Alpha Lode	7355- M5a	7355020	adit	0.01	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab
Tetra Alpha Mill	7355011	7355000	7355011-M4a	0.31	Native	FS Closed	Y	Y	
	7355-M4a	7355011	Top Mill	0.05	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab
	7355-M4b	7355-M4a	7355011	0.03	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab
Tetra Alpha Placer	7355011	7355000	7355011-M4a	0.72	Native	FS Closed	Y	Y	
	7533012	7355000	7355011-M4a	0.42	Native	FS Closed	Y	Y	
	7355-M3a	7355011	Processing	0.27	Native	Temporary - E	Y	Y	proposed Boulder Crk ford in Alt 2 only
	7355-M3b	7355-M3a	Claim	0.06	Native	Temporary - P	Y	Y	Proposed road
	7355-M3c	7355011	Claim	0.03	Native	Temporary - P	Y	Y	Proposed Ford, Boulder
	7355-M3d	7355011	Claim	0.02	Native	Temporary - P	Y	Y	Proposed Ford on Boulder
Troy	1000-E4a	Co 24	Claim	0.05	Tailings	Temporary - E	Y	Y	Existing Gate
	1000-E4b	1000-E4a	Claim	0.11	Tailings	Temporary - E	Y	Y	
Yellow Gold	7355025	7355020	7355026	0.05	Native	FS Closed	Y	Y	
	7355026	7355025	Alternate Processing	0.11	Native	FS Closed	Y	Y	
	7355050	7355000	Claim Trail	0.61	Native	FS Closed	Y	Y	Alt 3 preferred use (gate during use)
	7355055	7355050	Claim	0.37	Native	FS Closed	Y	Y	
	7355-E2a	7355055	Processing site	0.11	Native	Temporary - E	Y	Y	
Yellow Jacket	1305-E1a	1305035	Claim	0.11	Native	Temporary - E	Y	Y	
	1305-E1b	1305-E1a	Claim/House	0.15	Tailings	Temporary - E	Y	Y	

Forest Plan Direction

Transportation System

WWNF

The WWNF Forest Plan goal for the transportation system is: “To provide a safe, efficient, environmentally sound access for the movement of people and materials involved in the use and management of the National Forest Lands.” (WWNF *Forest Plan*, page 4-34)

WWNF Forest Plan standards and guidelines for the transportation system include:

- Provide the minimum system necessary for the specific activities authorized under the management area direction.
- Manage road and trail uses to protect resources, accommodate or restrict conflicting uses, provide reasonable safety, and prevent damage to the facilities.
- Protect water quality in all aspects of road and trail system management.
- Use practices that will avoid or minimize sediment production from new road construction and will correct existing sediment sources.

Basic custodial maintenance is performed on closed Forest Service roads to reduce damage to adjacent resources to an acceptable level and to ensure that the road remains in place to provide for potential future management activities or public access needs. Emphasis is given to maintaining the drainage facilities and runoff patterns. Vegetation encroachment and down woody material buildup may occur at this level. While roads are closed to highway vehicles, they remain open and suitable for OHV use and non-motorized travel. Seasonal closures exclude access during the wet season to protect the road and adjacent resources, and to protect wildlife and habitat.

Access

WWNF Forest Plan standards and guidelines for access include:

- Manage traffic as needed due to structural limitation of the road or limitation imposed by other resources, such as wildlife or recreation. (*Forest Plan*, page 4-34).
- Implement open road density guidelines as opportunities arise. Normally this will be following a timber sale project, but may also include special projects aimed at reducing open road densities in key areas (*Forest Plan p. 4-36*).

Open Road Densities

When calculating Open Road Densities to determine if a project meets Forest Plan guidelines, the WWNF Forest Plan states:

- “Meet the specific open-road density guidelines found in the direction for individual management areas unless a specific exception is determined, through the Forest Service NEPA process, to be needed to meet management objectives. 2/3/.

2/Total road density (closed and open roads) is not restricted except as stated in the standards and guidelines for soils.

3/The method used for calculating open road densities is an important factor. The average road density is calculated by dividing an area by the number of miles of open roads within that specific area.

If the area is too large, the average becomes meaningless; conversely, if the area is too small, the resulting figures may not provide useful information. For the purpose of implementing this direction, open road density will normally be calculated on the basis of subwatersheds. The area of each Management Area contained in each subwatershed will be calculated, and the open roads within that management area/subwatershed will also be calculated to determine the open road density.

The acreage and road mileage included in the calculation will include all acres (NF and private) within the major proclaimed boundaries of the National Forest, but will exclude private land acreage outside the major proclaimed boundaries.

“Islands” of proclaimed National Forest which are outside the major proclaimed boundaries will be included in the calculations if they are still under National Forest management. Decisions to leave open road densities greater than the guidelines are expected to be the exception rather than the rule” (Forest Plan p. 4-35).

Therefore, the Forest Plan identifies the following guidelines for calculating open road densities in order to comply with the Forest Plan:

“Calculate open road densities for each management area found within a subwatershed to include all National Forest and private lands within the major proclaimed boundaries of the National Forest.”

For this analysis, two calculations were used for determining whether open road densities by Management Area within a subwatershed (MA/SWS) comply with the Forest Plan; 1) all State, County, private, and Forest Service open roads, and 2) Forest Service open roads only, as those are the only roads over which the Forest Service has jurisdiction.

Open road density results are presented in Table 3-52 for all MA/SWS on the WWNF. The open road densities for Alternative 2 and 3 were derived from the WWNF GIS database, which reflects the current existing condition. The 0.38 (Alt 2) and 0.33 (Alt 3) miles of new miner-created temporary access roads are not included in the total open road miles or open road density calculation because they are not considered open roads.

Table 3-52: Open Road Densities by Management Areas within Subwatersheds (MA/SWS) For WWNF, County, and Private Roads under all Alternatives

Subwatershed	Management Area	Acres	Square Miles	Open Road Miles	Open Road Density
Beaver Creek	1	15.0	0.02	0.1	3.5
	15	415.6	0.6	0.1	0.2
	18	11672.5	18.2	43.6	2.4
Bull Run Creek	1	8.1	0.01	0.2	15.6
	15	867.5	1.4	1.2	0.9
	18	17302.3	27.03	45.2	1.7
	4	1.9	0.003	0.00	0.00
	6	585.2	0.9	0.00	0.00
Clear Creek	1	5.4	0.008	0.1	11.1
	18	1555.8	2.4	3.0	1.2
Lower Granite Creek	15	224.1	0.3	0.6	1.6
	18	831.2	1.3	2.7	2.1
Upper Granite Creek	15	255.7	0.4	0.0	0.0
	18	6484.5	10.1	27.6	2.7
	4	3.7	0.01	0.0	0.0
	6	393.7	0.6	0.0	0.0
Totals		40622.1	63.5	124.5	2.0

Note: Open Road Density numbers are calculated from the whole number, and not the rounded version as shown in Square Miles and Road Miles columns

Open Road Density = Open Road Miles / Square Miles

Open road densities are based on the management areas within the subwatersheds.
Data Source: WWNF GIS – 7/24/2013 - road_density_sws.xls (118kb), e.dreher

Table 3-3-53: Open Road Densities by Management Areas within Subwatersheds (MA/SWS) for WWNF Roads Only under all Alternatives

Subwatershed	Management Area	Acres	Square Miles	Road Miles	Open Road Density
Beaver Creek	1	15.0	0.02	0.1	3.3
	15	415.6	0.6	0.1	0.2
	18	11672.5	18.2	42.4	2.3
Bull Run Creek	1	8.1	0.01	0.2	12.6
	15	867.5	1.4	1.2	0.9
	18	17302.3	27.03	37.2	1.4
	4	1.9	0.003	0.0	0.0
	6	585.2	0.9	0.0	0.0
Clear Creek	1	5.4	0.008	0.1	11.1
	18	1555.8	2.4	2.6	1.1
Lower Granite Creek	15	224.1	0.3	0.6	1.6
	18	831.2	1.3	2.5	1.9
Upper Granite Creek	15	255.7	0.4	0.0	0.0
	18	6484.5	10.1	27.4	2.7
	4	3.7	0.01	0.0	0.0
	6	393.7	0.6	0.0	0.0
Totals		40622.1	63.5	114.3	1.8
Note: Open Road Density numbers are calculated from the whole number, and not the rounded version as shown in Square Miles and Road Miles columns					
Open Road Density = Open Road Miles / Square Miles					
Open road densities are based on the management areas within the subwatersheds. Data Source: WWNF GIS – 7/6/25/2013 - road_density_sws.xls (118kb), e.dreher					

Umatilla NF

No specific open road density standards and guidelines are included in the Umatilla NF Forest Plan.

A Motorized Access and Travel Management Plan was completed for the North Fork John Day Ranger District (USDA 1990) that designated roads, trails and areas for use by motorized vehicles. The Umatilla NF Forest Plan includes the following forest-wide standards and guidelines for access:

“Limit motorized vehicles to roads, trails, and areas which are designated for use in the Umatilla NF Motorized Access and Travel Management Plan. Temporary exceptions are authorized for those conducting official duties including firefighting, organized rescues, duties by special use permit or contract, and other listed in the Forest Motorized Access and Management Plan or having the district ranger’s authorization (Umatilla NF Forest Plan, pg. 4-50).”

A mining Plan of Operations is signed by the district ranger, and would provide the miner with authorization to use roads identified for access in the Plan of Operations.

The following Umatilla NF Forest Plan direction emphasizes that miners are allowed reasonable access to their claims:

“Under the mining laws, claimants are entitled to access to their mining claims. Access for exploration and development of locatable mineral resources will be analyzed in response to a proposed operating plan. A decision on reasonable access will be made as a result of appropriate environmental analysis (Umatilla NF Forest Plan, pg. 4-81).”

None of the Management Area specific standards and guidelines prohibit miners access to their mining claims. For example, Management Area A8-Scenic Area provides the following direction:

“Provide access to valid mining claims and private land (Umatilla NF Forest Plan, pg. 4-129).”

For Management Area C7 (Special Fish Management Area), which includes the majority of the analysis area on the Umatilla NF, The Umatilla Forest Plan include the following standard/guideline relative to transportation:

“Road construction, reconstruction and maintenance are permitted as long as consistent with the objectives of water quality and anadromous fish habitat.

Road construction will rarely occur within 500 feet of Class I and II streams, within 250 feet of Class III and IV streams, or on slopes over 60 percent. Road location, design, construction, and maintenance techniques used will focus on minimizing soil loss impacts to water quality and fisheries habitat (UNF Forest Plan, pg. 4-169).”

Under all alternatives, no new open Forest Service roads are proposed for construction, however miner-created temporary access roads are proposed under Alternatives 2 and 3. The following definitions included in Appendix 2, General Requirements, describe the various types of roads in the the analysis area:

Open road: Road designated for motorized travel on a Motor Vehicle Use Map and/or designated as a National Forest System Road Operating above a Maintenance Level 1. This includes roads seasonally open.

Closed road: Road listed in a forest transportation atlas and a National Forest System Road operating at a Maintenance Level 1 and/or not shown on a Motor Vehicle Use Map.

Temporary access road: Roads constructed by the miner whether by blading or continued travel. A road or trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road or trail and that is not included in a forest transportation atlas. These roads are not necessary for long-term resource management and will be decommissioned after use. The level of decommissioning

will be specified in the operating plan. Temporary access roads are given a number in the operating plans for tracking and mapping purposes only, and are not considered a National Forest System Road. An “M” number is a miner-created road, and an “E” number is an existing road that has not been designated necessary for long-term management and will be managed as a temporary access road.

Decommissioned road: A road that was listed in a forest transportation atlas and has had an action taken to eliminate use of the road, eliminate resource protection concerns, has no deferred maintenance needs, and requires no further maintenance. These roads have a route status of “decommissioned”. If specified in the operating plan, these roads may be utilized as temporary access roads, in lieu of new ground-disturbing construction.

Environmental Effects

Effects Common to Alternatives 1, 2 and 3

Forest Plan Consistency

WWNF

Under all alternatives, no new open Forest Service roads are proposed for construction, therefore open road densities would not increase under any of the alternatives. The WWNF Forest Plan states:

“Analyze projects which will require construction of new roads or which require opening old roads, with the intent of meeting specific management area road density guidelines during the activity. If the analysis indicates that meeting these guidelines during project activity is important in meeting the resource management objectives, and if the project will require an open road density in excess of the guideline, then mitigation of the effects of adding open roads will take place where practicable. Mitigation may include efforts such as closing other roads in the analysis area...” (Forest Plan pg. 4-36).

Although the above standard and guideline was designed to address impacts from construction or opening of existing Forest Service roads for timber sale haul, it can be applied to this project. **No new open Forest Service roads would be added to the watershed under any of the alternatives in this project, therefore all alternatives are consistent with WWNF Forest Plan open road density guidelines and no exceptions to the guidelines are needed.** The .38 miles (Alternative 2) and .33 miles (Alternative 3) of new temporary mine access roads are not included in the total open Forest Service road miles or open road density calculations because they are not open to the public. They are for use only by the miner as stipulated in their Plan of Operations, and requirements to prevent public access to those temporary roads are included in Appendix 2, General Requirements, Z-12.

Umatilla NF

Since no specific open road density standards and guidelines are included in the Umatilla NF Forest Plan, an analysis of open road densities would not be sufficient to determine consistency with the Umatilla NF Forest Plan.

Because the Forest Plan includes direction that allows miners reasonable access to their claims, and no new Forest Service open roads would be constructed, all alternatives would be consistent with the Umatilla NF Forest Plan.

Alternative 2

Alternative 2 would continue current management of the transportation system, including the Forest Service's implementation of past decisions as the program of work and funding allows. Administrative use and public access would remain at current levels. The proposed Plans of Operations, as submitted by the miners include the following access-related actions:

- Authorizing use of 4.71 miles of previously closed or decommissioned Forest Service roads (4.26 closed and .45 decommissioned)
- Authorizing use of 8.98 miles of existing miner-created temporary roads
- Authorizing use of 0.3 miles of new temporary roads created by the miner whether by blading or continued travel
- Authorizing use of 11 existing fords on FS closed or existing miner-created roads
- Authorizing construction of 2 new fords (2 fords at Tetra Alpha Placer)
- Authorizing placement of 2 temporary bridges to be removed at the end of each operating season (Bull Run Site #2 and Ruby Group)
- Authorizing installation of 2 new gates (East Ten Cent Creek)

Direct and Indirect Effects

The construction, maintenance, and reclamation of these temporary roads, fords and bridges would be regulated only by the proposed requirements the miners submitted with their Plans. However, their Plans may not have included specific direction for ensuring these access roads are seasonally closed. Therefore there may be a small increase in public access on these temporary roads, fords and bridges because the miners may not adequately close roads at the end of each season.

Mine Access

These access roads, fords and bridges would allow reasonable access to the mining operations. However, some of the proposed new temporary mine access roads, fords and bridges included in Alternative 2 may not meet the objectives of water quality and anadromous fish habitat, as is discussed in the Water Quality and Fisheries sections of this Chapter. No additional requirements for the use, maintenance and restoration of these temporary roads are included in this alternative. At the end of operations, the miners would reclaim access roads (Forest Service closed/decommissioned, and any miner-created temporary roads) authorized in the Plan of Operations. These reclamation activities typically include ripping and reseeding the road bed. Reclamation activities are outlined in a reclamation plan included with the calculation of the bond required for the Plan.

Public Access

A WWNF Forest Plan Transportation goal is “to provide safe, efficient, environmentally sound access for the movement of people and materials involved in the use and management of the National Forest lands” (WWNF Forest Plan, pg. 4-34). A Umatilla NF Forest Plan goal is to “Provide and manage a safe and economical roads and trail system and facilities needed to accomplish the land and resource management and protection objectives of the Forest (Umatilla NF Forest Plan, pg. 4-3).” Access to National Forest lands is being provided to the public under this alternative. Therefore, Alternative 3 would be consistent with WWNF and Umatilla NF Forest Plan direction for public access.

The remaining effects for Alternative 2 are the same as described above for “Effects Common to all Alternatives”.

Cumulative Effects

The cumulative effects analysis area is the Granite Creek watershed for the ten-year duration of the Plans of Operations.

With respect to foreseeable future WWNF Travel Management Plan (TMP), it is anticipated that designation of roads, trails and areas for motorized use under the TMP will limit cross-country travel within the project area. It is anticipated that the TMP would not restrict miners’ access to their operations because 36 CFR 228.12 allows them reasonable access. Roads incident to mining, not designated as open in the TMP, could be authorized for miner’s access through either a Plan of Operations or special use permit.

The new miner-created temporary access roads (approximately 0.38 miles) would temporarily add to the physical presence of roads in the watershed. Because the miners may not provide an adequate closure device at the end of each season, there may be an increase in public access on these temporary roads.

Alternative 3

Alternative 3 includes the following access-related actions:

- Authorizing use of 4.18 miles of previously closed or decommissioned Forest Service roads (3.73 closed and 0.45 decommissioned)
- Authorizing use of 8.21 miles of existing miner-created temporary roads
- Authorizing use of 0.43 miles of new temporary roads created by the miner whether by blading or continued travel
- Authorizing use of 11 existing fords on FS closed or existing miner-created roads
- Authorizing construction of 1 new ford (1 ford at Tetra Alpha Placer)
- Authorizing placement of 2 temporary bridges to be removed at the end of each operating season (Bull Run Site #2 and Ruby Group)
- Authorizing installation of 2 new gates (East Ten Cent Creek)

Alternative 3 differs from Alternative 2 by 1) decreasing the total miles of roads to be used for access to mining sites from 13.99 miles to 12.82 miles (FS closed, decommissioned, and existing or new

miner-created temporary access roads), and 2) decreasing the number of fords to be used from 13 to 12.

Alternative 3 also differs from Alternative 2 by including site-specific water resource protection measures (WRPMs) and General Requirements to the Plans. General Requirements G7, R12, and Z1-14 are specific to roads used by the miners (Appendix 2).

All Forest Service closed and temporary would be reclaimed to the satisfaction of the Forest Service when mining operations are complete.

Direct and Indirect Effects

Unlike Alternative 2, additional requirements for the use, maintenance and restoration of these temporary roads, fords and bridges are included in Appendix 2, General Requirements.

This alternative would ensure that temporary miner-created access roads, “closed” Forest Service system roads, and existing temporary roads used in accordance with an approved Plan would be closed to public use and maintained according to the General Requirements (Appendix 2). Under General Requirement Z-12, during seasonal shutdowns, to restrict vehicular travel, the miner is responsible for closing roads not designated as open, and all temporary access roads as identified in the Plan of Operations.

Mine Access

The Umatilla NF Forest Plan states that reasonable access to mining operations is stipulated at 36 CFR 228.12 (*Umatilla NF Forest Plan*, pg. 4-81). The new miner-created access roads, fords and bridges included in this alternative were reviewed by the minerals and transportation specialists, and they determined that the roads, fords and bridges identified under Alternative 3 in Table 3-51 would provide reasonable access to the miners (Refer to last column in Table 3-51).

Public Access

A WWNF Forest Plan transportation goal is “to provide safe, efficient, environmentally sound access for the movement of people and materials involved in the use and management of the National Forest lands” (*WWNF Forest Plan*, pg. 4-34). A Umatilla NF Forest Plan transportation goal is to “Provide and manage a safe and economical roads and trail system and facilities needed to accomplish the land and resource management and protection objectives of the Forest (*Umatilla NF Forest Plan*, pg. 4-3).” Access to National Forest lands is being provided to the public under this alternative. Therefore, Alternative 3 would be consistent with WWNF and Umatilla NF Forest Plan direction for public access.

The remaining effects for Alternative 3 are the same as described above for “Effects Common to all Alternatives”.

Cumulative Effects

The cumulative effects related to the foreseeable future WWNF Travel Management Plan (TMP) are the same as under Alternative 2. However, there would be no public accessibility to the temporary mine access roads due to the addition of the General Requirement Z-12 as discussed above. Therefore there would be no increase in public access from this alternative.

Comparison of Alternatives

Alternative 3 would include preventative measures (Z-12) to ensure that no increase in public access to temporary mine access roads would occur, while Alternative 2 may result in an increase in public access on these temporary roads because the miners may not adequately close roads at the end of each season.

All alternatives would be consistent with WWNF Forest Plan open road density guidelines, and Umatilla NF Forest Plan transportation standards/guidelines for the reasons stated above under “Forest Plan Consistency” and “Direct/Indirect Effects”.

Recreation_____

Introduction

This document describes the recreation resources within the Granite Creek Mining analysis areas and the effects of the project alternatives; including direct, indirect, and cumulative effects. This document focuses on recreation opportunities that are likely to experience effects from mining operations including: (1) developed recreation sites, campgrounds, trails and trailheads, motorized and non-motorized trails, and Scenic By-way, (2) Wilderness, and (3) Dispersed Recreation.

The analysis area includes the Granite Creek Watershed portions of which lie on both the Wallowa-Whitman and the Umatilla National Forest. The analysis area is 94,480 acres (40,624 Wallowa-Whitman, and 49,539 Umatilla). 28 mining operations are proposed within the area with a total area of disturbance of 119 acres or 0.0013% of the National Forest System lands located within the project area. Each site is small, typically between 2-5 acres in size with seven operations proposing disturbance of between 8-10 acres.

The purpose of this project is authorization of 28 Plans of Operations that is consistent with the Wallowa-Whitman Land and Resource Management Plan (WWN Forest Plan), the Umatilla Land and Resource Management Plan (UNF Forest Plan), agency policy, direction, the laws and regulations governing the occupancy of National Forest System lands related to mineral entry.

Overview of Issues Addressed

The primary issue is the potential impact or conflicts related to the interaction between the recreational activities common to the area and mining.

Recreational conflict is defined as “goal interference attributed to another’s behavior” (Jacob and Schreyer, 1980). Anytime people with different goals meet on the same landscape conflicts can occur (Giroux).

The potential for interaction will be measured by evaluating the size of the area, the location of the mining related to developed sites, the type of recreation activities anticipated in the area, and the percentage of time each year that both uses will occur simultaneously.

Analysis Framework: Statute, Regulatory Environment, Forest Plan and Other Direction.

Regulatory Environment

Forest Plans

Wallowa-Whitman National Forest Plan: Forest-wide Standards & Guidelines (1990)

The following list of standards and guidelines are a subset of all applicable WWNF Forest Plan direction. This project is being analyzed for consistency to all applicable Forest Plan standards and guidelines for recreation resources.

Recreation

Goal: *In coordination with and awareness of recreational opportunities on other lands, provide a wide variety of recreation opportunities in an attractive setting, and make those opportunities available to all segments of society.*

Standards and Guidelines

1. Recreation Opportunity Spectrum. Provide a full range of recreation opportunities, except urban, as described in the Recreation Opportunity Spectrum (ROS) and outlined in the National Recreation Strategy
2. Provide for interpretation and environmental education as an important part of outdoor recreation in all ROS classes. Promote a better understanding of the long-term compatibility of people living in harmony with nature as well as our natural and cultural history resources.
3. Encourage innovation, creativity, and partnership arrangements will be in all ROS settings to establish and sustain a balanced range of recreational services and facilities that are responsive to changing recreation demands on the Wallowa-Whitman National Forest.
4. Meet the goals for setting and experience opportunities for each ROS class as outlined below.

Primitive:

Timber harvest is not appropriate Access must be nonmotorized with high to moderate degrees of challenge and risk to the pedestrian or equestrian user through a matching variety of trailless areas and different levels of trails.* Site development scale is Level 1 or less.

Restrictions and controls on the user are not evident after entry. Use densities of PAOT (persons at one time) per acre should range from 1 to 25, depending on the landscape's ability to absorb the sights and sounds of humans. Road management objectives are to prohibit use of any existing primitive roads by any motorized user. No roads may be built. Any existing primitive roads will be regarded and/or revegetated to natural-appearing conditions. The compatible visual quality level is preservation Interpretation is through self-discovery, possibly augmented by books or guides, with no on-site facilities.

Semi-primitive Non-motorized:

Unscheduled timber harvest may occur for salvage of dead timber resulting from catastrophic events or to improve and maintain a healthy, attractive, semiprimitive setting. No new roads may be built. Motorized harvesting and mineral exploration should be done in the low public use season and in not more than half of any decade. All activities must meet 'foreground retention' visual quality objectives. Road management objectives are to eliminate or prohibit public motorized use of any existing primitive roads or trails. No facilities except for trail shelters, limited signing, sanitary and safety needs will be installed. All facilities will be made from native-like, rustic materials. Site

development scale is level 2 or less. Use densities of PAOT per acre should range between 0.004 and 0.08 depending on the landscape's ability to absorb the sights and sounds of humans. Interpretation is through self-discovery, augmented by books, guides and maps, with no on-site facilities.

Semi-primitive Motorized

Vegetation management may range from no timber harvest to limited unscheduled regeneration cutting and sanitation salvage for the purpose of maintaining a healthy, attractive semiprimitive setting. Harvest units must meet "foreground partial retention" visual quality objectives

Motorized harvesting and mineral exploration may be done over "primitive" road systems primarily in the low public use season. Public access is by trails and primitive roads ranging in challenge from most difficult to easiest.⁷ Road management objectives are to encourage high clearance 4-wheel drive vehicles and trail bikes, but discourage highway vehicles. Primitive roads are maintained at Level II. Site development scale is Level 2 or **less**. Interpretation is through very limited on-site facilities, maps, brochures, guides, and other portable media.

Facilities are limited to shelters, signs, sanitary, and safety needs in native-like, rustic materials. Use densities of PAOT per acre should range between 0.004 and 0.08 depending on the landscape's ability to absorb the sights and sounds of humans.

Roaded Natural:

Timber harvest may be scheduled (see VQO direction under Visual Resource Management) and should meet "retention" or partial retention" as seen from roads and trails. Access is generally single- or double-lane dirt or gravel roads. Road management objectives are to generally accept or encourage use by dispersed recreationists in highway vehicles. On some logging spurs or other single-purpose roads, this use may be discouraged or eliminated. Dispersed area facilities should be level 2 or less and may include shelters, boat ramps, sanitary facilities, interpretive facilities, and safety needs in native, rustic materials. Use densities of PAOT per acre should range between .04 and 2.5 depending on the landscape's ability to absorb the sights and sounds of humans. Density range includes averaging in developed sites. The norm for developed sites should be development scale 3. Mineral exploration and extraction may be appropriate but meeting adopted VQO. Interpretation is through signs and other structures, such as overlooks, decks and boardwalks, using native-like materials with some refinement in design, printed and other portable materials, and limited interpretation by Forest staff.

Roaded Modified:

⁷ See Trails Handbook (FSH 2309.18) for definition of difficulty levels.

Timber harvest is dominant but carried out within the NFMA regulation of being shaped and blended with the terrain. Stumps, skid roads, landings, and clearcut forms all may be dominant to the user. Road management objectives for local roads would often provide a complete mix of opportunities. Access to recreation campsites, berry fields, wood gathering areas, etc., is encouraged. Some roads will be managed to permit use by high-clearance vehicles and trail bikes while discouraging use by highway vehicles. Use on others by all vehicles may be restricted or prohibited to meet wildlife, safety, or other objectives. User-established sites will be recognized and prescriptions for timber harvest, slash cleanup, site preparation and other silvicultural practices will consider the environmental setting and recreational attractions. The attempt will be made to retain a significant measure of this character after treatment. Such sites will also be considered in grazing plans and the timing of when livestock are on the sites.

Interpretation is through simple on-site facilities such as signs or numbered posts made of native-like rustic materials, printed or other portable material. Facilities may include shelters for winter use by ski tourers or snowmobiles. Use densities of PAOT per acre should range between, .008 and 1.2.

Rural:

Management directions for the small area of rural ROS on the Forest are included under Management Areas 5 and 16

5. Discourage use where actual use densities exceed desirable levels or encourage use in other areas. These actions may include such things as recommending little-used areas to the public, limiting or increasing trailhead parking, maintaining or increasing difficult access, or separating uses (e.g., motorized and nonmotorized, or pedestrian and equestrian).
14. **Special Areas.** Protect special places on the Wallowa-Whitman National Forest: e.g., dispersed recreation sites, water features, rock or unique landform features, areas of unique vegetation, historic sites, or other places which are special to Forest users commensurate with other Forest management Objectives.
15. **Road, Trail, Area Closures and off-road vehicle** use will be in accordance with the Forest Travel Management Plan and 36 CFR 295.⁸ This plan will be reviewed annually and revised as necessary, considering management needs and public desires

Umatilla National Forest Plan: Forest-wide Standards & Guidelines (1990)

The following list of standards and guidelines are a subset of all applicable UNF Forest Plan direction and this project is being analyzed for consistency to all applicable Forest Plan standards and guidelines for recreation resources.

Goal: *Manage for a broad spectrum of recreation opportunities and experiences on the Forest.*

⁸ Superseded by 36 CFR 261.13 and 36 CFR 212.51

General

1. Use the Recreation Opportunity Spectrum (ROS) to inventory the array of recreation opportunities on the Forest and to guide management of the physical, social, and managerial settings.
2. Encourage public participation in recreation management and in the decision making process for projects, programs, or policies affecting recreation opportunities.
3. In all management activities, incorporate recreation considerations to enhance the quality of opportunities and positively affect use.
4. Provide Forest recreationists with freedom of choice in selecting sites, areas, routes, and activities to meet their recreation needs.
5. Emphasize "leave no trace" techniques in all portions of the Forest to reduce management costs and minimize resource impacts.
6. Increase revenues from recreation use where cost-effective. Fees should be competitive, based on market values and the principle that those who benefit directly pay for the activity or facility. Where possible, receipts should be used to benefit the area where the fees were collected.
7. Risk management will include reasonable efforts to provide inspections of lands and facilities, warnings on the safe use of areas/facilities and inherent dangers, management of medical emergencies, training and supervision of personnel, accident and injury reporting, documentation, and sharing of information.
8. Develop a Forest Recreation Opportunity Guide (ROG) containing the kinds and locations of the Forest recreational opportunities. Highlight a wide variety of opportunities (locations and activities) to disperse use; e.g., roadless, old growth, wildlife areas, historic sites, unique ecological areas, scenic routes, facilities for the disabled, motorized, rivers, streams, and other special places. Include basic management policies and regulations that govern the area. Update as needed to keep information current.
9. Maintain and update the Recreation Information Management (RIM) System to provide data for recreation planning and management per manual and handbook direction.
10. Maintain recreation as an important component of access management. Acquire the access needed to provide Forest recreation opportunities, in compliance with laws and regulations. Retain or acquire public access to all areas of the Forest utilizing easement, prescriptive rights, land acquisition, and land exchange procedures.
11. Priority will be placed on preventing conflicts among users by good communications and providing information to affected people. Indirect management actions (i.e., design, education, information, etc.) will be preferred over direct actions (i.e., restrictions, enforcement, etc.). Generally, recreation conflicts will be resolved in order of priority: (1) Public safety, (2) wise use of resources, (3) retention of or increased wide spectrum of opportunities, (4) prevention or filling of recreation opportunity voids, and (5) relation to the surrounding environment.

12. Make the first impression of the Forest a good one. Put priority on 'curb appeal' at Forest entrances, administrative sites, major Forest roads, recreation developments and other high use places.
13. A positive approach should be used when stating rules and regulations (signs, brochures, etc.). Regulation of outdoor recreation should be minimized; ensure that those adopted are effective, useful, and justified. Regulations should contribute to enjoyable experiences in the long run, rather than be for the convenience of administrators.

Dispersed Recreation

1. Provide for a spectrum of recreational activities such as hunting, fishing, gathering forest products, viewing scenery, camping, hiking, floating, and so forth.
2. Provide a range of physical (remoteness, size of area, evidence of humans), social (encounters), and managerial (restrictions, information services) settings for recreation.
3.
 - a) Inventory, evaluate, and manage dispersed occupancy sites and other special places. Project planning will provide for the protection of established occupancy spots (especially hunter camps) and other special places. Sites will be rendered unusable only when not in public demand or a higher priority use for other resources is timely, clearly needed, and where other sites to satisfy the recreation need are made available.
 - b) Manage the occupancy sites and adjacent area to at least partial retention visual quality level.
4.
 - a) Incorporate an integrated ecosystems approach, the special appeal of the Blue Mountains, Scenic Byways and Corridors Management (roads, trails, and rivers) into Forest recreation planning and management. Coordinate with adjacent landowners to achieve a continuity of management along corridors and areas.
 - b) Identify the potential of any proposed activity to change Recreation Opportunity Spectrum (ROS) classes in all project environmental analyses.
5. Manage public use as necessary to provide safety, sanitation, and appropriate resource setting, while minimizing regimentation. When necessary to place restrictions on use reasons should be explained and displayed in offices, literature, and at the point of restriction.
6. Provide specialized or modernize dispersed facilities, or site modification needed to maintain or enhance the variety of dispersed recreation opportunities, prevent pollution from human waste, provide safety (including fire), or reduce undesired resource effects.
7. Encourage people not requiring or desiring a wilderness setting to use nonwilderness National Forest System lands for their recreation needs.
8. Location and design standards for, and construction of, new or reconstructed roads and trails will accommodate user developed occupancy spots at locations and quantities appropriate to the planned ROS experience level.

9. Operate and maintain the Forest road system to provide dispersed recreation opportunities in concert with management area emphasis and direction.
10. Limit motorized vehicles to roads, trails, and areas which are designated for use in the Umatilla National Forest Motorized Access and Travel Management Plan. Temporary exceptions are authorized for those conducting official duties including firefighting, organized rescues, duties by special use permit or contract, and others listed in the Forest Motorized Access and Management Plan or having the district ranger's authorization.

Off-highway Vehicle Use

1. Ensure that off-highway vehicle (OHV) use is managed to protect other resources, promote safety of users, and minimize conflicts with other uses (Executive Order EO 11644, as amended by EO 11989). Use OHV prohibitions only where needed to minimize disturbance of wildlife, provide a range of recreation opportunities, or to protect the soil and water resources.
2. Continue and expand programs and agreements with Oregon and Washington for snow, OHV, and ATV trails and facilities.
3. Encourage OHV use to remain on designated routes by using route location, design, and public information programs. Routes should be planned to integrate on-road and offroad travel and disperse use across broad areas.
4. If necessary to eliminate OHV use, insofar as possible, provide a substitute area for the OHV opportunity eliminated.
5. In riparian areas, trails for motorized use will be managed to protect water quality and fish and wildlife habitat. Existing motorized use trails should be relocated outside the floodplain or 'hardened' where practical. OHV use will be limited to designated routes.
6. Emphasize permitted activities rather than prohibited ones in signing and information to minimize recreation use conflicts.
7. Review the Forest motorized access and travel management plans annually and revise as necessary (usually biennially).
8. Public information describing the areas and routes where motorized use is permitted, prohibited, or restricted; explaining the conditions of use; and providing reasons for such closures will be provided on a travel map. The map will be reviewed annually and revised as necessary (usually biennially).

Trails

1. Provide and manage the Forest trail system as a recreation resource that complements land management objectives.

2. Provide and manage a trail system to offer the full range of opportunities and difficulty levels: Primitive, mechanized, all-season, barrier-free, short and extended, interpretive, historical, and more. Provide for trail difficulty levels appropriate to recreation opportunity objectives.
3. Annually update the Forest Trail Management Plan to identify the current mix of development, management, and maintenance.
4. Construct, reconstruct, relocate, maintain, and manage trails and associated trailheads to standards appropriate for serving the intended type and level of use and to provide opportunities for satisfying recreation experiences, while minimally affecting soil, water, and vegetative resources, and requiring minimal maintenance.
5. Priority for new trails or trail relocation will be to provide route loops, fill opportunity voids, or resolve user or resource conflicts.
6. Trails located in resource development areas must be included in the implementation strategy analysis and project environmental analysis. Any decision to abandon the trail must be clearly documented. To the extent possible, trails should be protected during project activities. If not practical to preserve an existing trail, the trail should be relocated

Other Direction

The 1994 Elkhorn Drive Management Plan identified the following goals:

1. Showcase outstanding National Forest scenery;
2. Increase the public's understanding of the National Forests as the major provider of outdoor recreation;
3. Increase public awareness and understanding of all National Forest activities;
4. Meet the growing demand of driving for pleasure as a significant recreation use;
5. Increase the use of the National Forests by non-traditional users including urban minorities, the disadvantaged, and the elderly;
6. Contribute to the Nation's overall Scenic Byways effort.
7. Ensure visitor recognition that the Scenic Byway is administered through the cooperative efforts of the Forest Service, adjacent landowners, and various state and local public agencies.
8. Help strengthen a positive image of the Forest Service as a multiple-use agency by providing a variety of safe, quality interpretive sites and recreation facilities.
9. Foster an understanding and appreciation for the culture and history of the region, and encourage a land use ethic that provides for stewardship of a sustainable environment.
10. Promote understanding of ecosystem management and forest ecology in light of historic management practices, forest health, endangered species and economic stability.
11. Provide a positive example of innovative interpretation and high quality recreation opportunities and visitor services to local communities, adjacent land managers, and the Forest Service.

Effects Analysis Methodology

Specific Assumptions

Assumption 1: Recreational activities common to the area will occur at the same time of the year that mining operations are proposed.

Assumption 2: Conflicts from mining operations will be limited to the sights and sounds of the operation or any restrictions to conducting a specific recreational activity as a result of operations.

Assumption 3: That the Multiple Use Act, 30 USC 612(b) allows other uses of the surface of NFS lands, including recreation, provided that "any use of the surface... shall be such as not to endanger or materially interfere with prospecting, mining or processing operations or uses reasonably incident thereto." (612(b)). A mining claimant can protest to the managing federal agency about public use which results in material interference and, if unsatisfied, can bring suit to enjoin the activity (Mineral Law, Terry Maley)

Specific Methodology

Indicators

Direct and Indirect of proposed mining activities, access (roads, fords, bridges), and and Forest Service Requirements (including General Requirements, site-specific protection measures and monitoring)

The potential for interaction will be measured by evaluating the size of the area, the location of the mining related to developed sites, the type of recreation activities anticipated in the area, and the percentage of time each year that both uses will occur simultaneously.

Indicator Measure 1: The location of the mining related to developed sites, trails, interpretive sites, the Scenic By-Way, and Special Interest Areas.

Short-term timeframe: 1 year, this provides sufficient time to evaluate the potential conflict between uses for comparison.

Long-term timeframe: 10 years, to make assumptions beyond this timeframe speculative.

Spatial Boundary: Mining sites in the Project Area, because of the distance of mining operations from recreation sites located outside the Project Area, and there will be no hauling of material from mining sites with the exception of the removal of small samples for analysis, the potential for contact between recreation activities and mining is minimal.

Methodology: Determine distance and topographic features that provide barriers from the sights and sounds of mining operations from the nearest recreational development.

Indicator Measure 2: An evaluation of the type of recreation anticipated to occur in the project area that potentially will occupy the same area at the same time. The evaluation will identify any conflicts with the ability to conduct a specific recreation activity as a result of mining activity.

Short-term timeframe: 1 year, this provides sufficient time to evaluate the potential conflict between uses for comparison.

Long-term timeframe: 10 years, to make assumptions beyond this timeframe speculative.

Spatial Boundary: Mining sites in the Project Area, because of the distance of mining operations from recreation sites located outside the Project Area, and there will be no hauling of material from mining sites with the exception of the removal of small samples for analysis, the potential for contact between the two activities is minimal.

Methodology: Determine the type of recreational activity and any barriers that might prohibit or restrict the activity as a result of mining operations.

Affected Environment

Wallowa-Whitman National Forest

The portion of the Granite Creek Watershed analysis area that is on the Wallowa-Whitman National Forest (WWNF) is considered non-developed or General Forest Area where visitors engage in dispersed activities such as hiking, hunting, and dispersed camping in undeveloped areas. Based on a survey conducted in 2009, of forest visitors recreating on the WW NF, an estimated 28% use General Forest Areas.

In descending order of use, major recreation activities within General Forest Areas include: camping, motorized travel, big-game hunting, fishing, and hiking. In addition, driving for pleasure, picking mushrooms or berries and fuelwood gathering occur in the area.

No developed sites such as designated camping areas, designated picnic areas, or trailheads are located in or near the analysis area within the WW NF. However, undeveloped hunting camps occur throughout the area along or near open roads, with an estimated at 20-30 sites or 10-15 acres of potential disturbance. Some are plainly visible, having been used to park a recreation vehicle or pitch a tent each hunting season. Others are much less conspicuous, with additional camps established each year and other sites going several years without use. The analysis area occurs within the Sumpter and Desolation Big Game Management Units of Oregon Department of Fish and Wildlife. Hunting season typically begins in August and extends through November.

The 1990 WWNF Forest Plan identifies 2% of the Upper Granite analysis area as roaded modified, 6% as semi-primitive motorized, 13% as semi-primitive non-motorized, and the remaining area, 79%, as roaded natural (see descriptions above). The North Face vehicle closure area (245 acres) is located within the analysis area.

All operations are in roaded-modified or roaded-natural. With the exception of roaded-modified, all areas are characterized by a natural or natural-appearing environment. In the semi-primitive areas motorized use is light, but allowed on existing roads.

With the exception of the North Face Vehicle Closure, the entire area is open to motorized travel including off-road travel. All maintenance level 1 roads (closed roads) are open to off-road vehicles.

Travel increases during the big-game hunting season; otherwise, travel is light. Within the closure area, the level 1 roads receive little use; however, the primary route through the closure, Road 7300-755, continues to receive use and is a designated snowmobile route.

Several miles of designated snowmobile trails occur within the area. These trails utilize snow-covered forest system roads that are mechanically groomed (snow-packed). The designated trails are used by snowmobiles during the winter months, generally December through the middle of March. Occasionally, snowmobilers use non-designated roads. Due to terrain limitations, off road or cross-country snowmobile travel rarely occurs.

One hiking trail, FS 1604, is located on the northeastern edge of the analysis area, and is not immediately adjacent to any mining operation.

Approximately 10% or 13 miles of the 106 mile Elkhorn Scenic By-way (County Road 520 and Forest Road 73) lie within the analysis area. The portion of the Scenic by-way within the analysis area runs from Blue Spring Summit to Crane Flats.

Approximately 348 miles of open and closed roads within the analysis area can be used for recreation activities common to General Forest Areas. Of these roads, 61 miles, or 17.5%, are within 200 feet of stream, and have the highest potential for introducing sediment into streams. Approximately 32.9 of the 61 miles are closed roads. Closed roads are not maintained and therefore receive less use, thereby further reducing the potential for sediment introduction.

The Ah Hee Diggings Interpretive Site displays the mining efforts of Chinese miners in the late 1800s and the residual hand-stacked rock tailings can be seen from the Elkhorn Drive Scenic Byway. This area is withdrawn from mineral entry and no mining is allowed.

Umatilla National Forest

Non-Wilderness Recreation

Olive Lake Campground

Olive Lake Campground is the only developed campground within the analysis area. It is a popular, high-use fee campground during the summer and early fall months. There are 26 campsites, 2 day use sites, a fishing platform, boat ramp/dock and a 2.5 mile hiking trail around the perimeter of the lake. Fishing, boating, picnicking, overnight camping, and hiking are popular activities at this site. Olive Lake was dammed in the early 1900's to supply water to the Fremont Powerhouse. Portions of the wooden pipeline can still be seen while traveling along FS Road 10, between Olive Lake and the Fremont Powerhouse.

Fremont Powerhouse Complex

The Fremont Powerhouse Complex is located within the analysis area. The site consists of a turn-of-the-century powerhouse and caretaker house, three additional residences, numerous outbuildings and an interpretive sign. Although the powerhouse has not been operational since the 1960's, the site is used intermittently for administrative purposes and the Oregon National Guard recently completed a renovation project at the site. Three of the residences are open to the public for cabin rental use and the site is also a popular location for visitors to learn more about the area's early mining history.

Anticipated future plans will likely include on-site interpretive tours during the summer months and the inclusion of an additional residence into the cabin rental program. The site will continue to have occasional administrative use as well.

Dispersed Camps

There are numerous dispersed camps, estimated at 40-50 sites, located along or near the open roads. This is a popular area for deer and elk hunters, and receives a lot of dispersed camping use during the fall season, along with some use during the summer months. A generic description of a dispersed campsite consists of a user-made area that is generally adjacent to a developed road. The site often has a meat pole in the tree, a rock fire ring and a hardened parking/camping surface for one to three families. In addition to dispersed camping and hunting activities, mushrooming, firewood gathering and sightseeing are other popular recreational pursuits in the area. The analysis area occurs within the Desolation Big Game Management Units of Oregon Department of Fish and Wildlife. Hunting season typically begins in August and extends through November.

Scenic Area and Trails

A portion (3,021 acres) of the Vinegar Hill/Indian Rock Scenic Area lies within the analysis area. There are four non-motorized trails in this area; including: #3173 Ben Harrison Trail (0.5 miles), #3022 Lost Creek Trail (1 mile), #3035 Saddle Camp Trail (2 miles), and #6141 Blue Mountain Trail (1.5 miles). The Saddle Camp/Lost Creek Trailhead is the only developed trailhead accessing the scenic area within the analysis area. Facilities include a graveled parking pad, signing and a bulletin board. The Scenic Area is managed for its recreation and scenic values with no motorized access within the analysis area. Primary use occurs during the fall big game hunting seasons, but summer recreational use continues to slowly increase due to outstanding scenic values. Sight-seeing, hiking and horseback riding are popular activities for this area.

OHV use

There are no designated OHV (Off Highway Vehicle) trails in the area. However, OHV activity is permitted and does occur on open roads in the analysis area. This includes riding motorcycles (Class III) and four-wheelers (Class I) on these roads. With the exception of Forest Service Road 10, all open roads within the analysis area are open to OHV travel, per the 2001 Interim Program for ATV/OHV Strategy on the Umatilla National Forest (UNF). Additionally, the 1000460, 1000520, 1010370, 1035060, 1035080, 1038060, 7350050, 7350052 and 7350070 are forest system roads open seasonally to OHV use but closed to other motorized travel.

Snowmobile use

Forest Service Road 10 is groomed for snowmobile use from the junction of Rd. 13 and Rd. 10 to Desolation Guard Station. All of FS Rd. 10 within the analysis area serves as a groomed snowmobile trail during the winter months. A local snowmobile club grooms the trail (Rd. 10) when there is adequate snow coverage, typically between the months of December and March. Because snowmobile use would occur outside of the time when miners typically operate, there would be no measurable impact to snowmobile activity from the action alternatives.

Wilderness Recreation

Legislative guidance for management of the wilderness resource administered by the UNF is contained in the Wilderness Act of 1964 (PL 88-577), which directs that the land be managed so it

“generally appears to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable.” Wilderness is further defined as “...in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled”. Untrammelled means “not subject to human controls and manipulations that hamper the free play of natural forces.”

The following trails are located within the North Fork John Day Wilderness: #3022 North Fork John Day River Trail (.2 miles), #3173 Ben Harrison (4.5 miles), #3018 Lake Creek Trail (2.5 miles), #3022 Lost Creek (4.1 miles), #3035 Saddle Camp (2.5 miles), and #3016 Granite Creek Trail (2.4 miles and 1 mile in general forest area). Ben Harrison and Granite Creek Trailhead is the only developed wilderness trailhead in the analysis area. Features include a graveled parking pad, signing and a bulletin board. Lost Creek Saddle Camp and Olive Lake Recreation Area both offer trail access into the wilderness.

While trail use is heaviest during the fall big game hunting seasons, there has been an increase in summer-time use by recreationists. Some of these activities include camping, hiking, horseback riding, huckleberry picking, sightseeing, and viewing remnants of the area’s rich mining history. There are several high-use traditional campsites located along these trails within the analysis area. These sites are monitored and encouraged for use due to the topography, river location and Leave No Trace principles, which encourages use at existing sites in order to minimize impacts to vegetation and stream banks.

Most of the wilderness within the analysis area is classified as semi-primitive (using the Wilderness Resource Spectrum), with a small portion to the north designated as primitive.

Although visitors are increasing every year, the North Fork John Day Wilderness gets relatively low use in comparison to other wilderness areas nearby, including the Eagle Cap Wilderness on the Wallowa-Whitman N.F. and the Wenaha-Tucannon Wilderness on the north half of the UNF.

Trail locations are primarily in canyon bottoms, which coincide with most historic mine activity within the wilderness area.

The recreational value of wilderness is to offer outstanding opportunities for solitude or primitive and unconfined recreation (Section 2 of the Wilderness Act). Users of the area are seeking an experience isolated from sights, sounds, and the presence of others. Additionally, users wish to feel a part of nature, to have vastness of scale, and a degree of challenge and risk while using outdoor skills. The landscape is typically void of developments and the evidence of humans.

Special Interest Areas

The following table identifies the Special Interest Areas located within the analysis area:

Table 3-54: Granite Creek Watershed Special Interest Areas

Special Interest Area	Acres in Analysis area
Vinegar Hill	3229.51
Twin Mountain Roadless Area	2930.39
North Fork John Day Wilderness	25217.40
Greenhorn Mountain Roadless Area	2488.52
Special Fish Management Area	16241.61
Olive Lake - Fremont Powerhouse	1001.36
Vinegar Hill RNA	179.05
Greenhorn Historical Area	83.72
North Fork John Day Wild & Scenic River	1.61
Ah Hee Diggings Interpretive Site	60

Table 3-55: Wilderness Acres

Wilderness	Acres
North Fork John Day Wilderness	25217.43

Table 3-56: Inventoried Roadless Acres

Roadless Area	Acres
Greenhorn Mountain	2488.53
Twin Mountain	2930.39
Grand Total Acres	5418.92

Recreation Opportunity Spectrum

The table below identifies the ROS classes present within the analysis area and the number of acres for each.

Table 3-57: Wallowa Whitman NF Recreation Opportunity Spectrum

Recreation Opportunity Spectrum	Acres
Roaded Modified	2359.01
Roaded Natural	31445.79
Rural	223.49
Semi-Primitive Motorized	6281.59

Semi-Primitive Non-Motorized	1590.02
Grand Total Acres	41899.90

Table3-58: Umatilla Recreation Opportunity Spectrum

Recreation Opportunity Spectrum	Acres
Roaded Modified	7047.47
Roaded Natural	12643.95
Semi-Primitive Motorized	705.73
WPT ⁹	2138.17
WSN	23083.69
Grand Total Acres	45619.01

Operation location by ROS:***Roaded Modified:***

- Eddy Shipman
- Make-It
- Hopeful 1,2, and 3

Roaded Natural:

- East Ten Cent Creek
- Magnolla Group
- Tetra (load)
- Tetra (Mill and Alpha)
- Muffin
- Yellow Gold
- Troy D
- Little Cross
- Blue Smoke
- Bunch Bucket
- Ruby Gold (East Site)
- Grubsteak
- Blue Sky - Bull Run
- Lightning Creek
- Yellow Jacket 123
- Altona
- Sunshine/McWillis

⁹ WSN (Wilderness Semi Primitive) and WPT (Wilderness Primitive Trail) are both wilderness designations and the effects are discussed in the Wilderness section.

- Belvadear Group
- Olive Tone
- L&H
- Royal White Group
- Lucky Strike
- Rosebud

Rural:

- City Limits

Semi-Primitive Motorized:

- Ruby Gold (West Site)

Environmental Consequences

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

There would be no direct effects on recreation if no action were to take place. Recreation activities and opportunities would remain at the same level, thus there is no means of estimating the indirect effects of taking no action.

US citizens have a statutory right to remove valuable minerals from National Forest System lands open to mineral entry. Therefore, mining activities would occur under all the alternatives, including the No-Action Alternative. However, the 28 proposed Plans of Operations would not be authorized for approval under this alternative.

The regulations governing the surface use of National Forest System lands allow a level of operations to occur without authorization from the Forest Service. Each specific site is evaluated to determine what level of activity may occur under the regulations. This evaluation is first conducted by the miner. However, the level of operations allowed under the regulations cannot cross the threshold of causing a significant disturbance. Operations that may cause a significant disturbance of surface resources are to notify the Forest Service and may require authorization within a Plan of Operations before mining can occur. There is no way to determine how many operations would occur or are currently operating at this level (without a Plan of Operations) and therefore no way to measure the effects.

Cumulative Effects of No Action

Given that there are no measurable direct and indirect effects that would occur under the no action alternative, there would also be no measurable cumulative effects.

Alternatives 2 and 3

Direct and Indirect Effects of Proposed Mining Activities (Alternatives 2 & 3)

Indicator Measure 1: *The location of the proposed mining activities related to developed sites, trails, interpretive sites, the Scenic By-Way, and Special Interest Areas.*

Developed Sites

Olive Lake, the only developed campground, and the Fremont Powerhouse which is used as a Recreational Rental, are the two developed sites within the analysis area. Access to both sites is via Forest Service Road 10. None of the proposed mining operations would use this route as access. The nearest operations are located approximately 5 miles to the northeast and 5 miles to the southeast. The distance to the nearest operations and the topography serve as barriers so that visitors are unlikely to see any operational mining activities from these developed sites. Sounds associated with mining operations are typical of any construction projects. Operation of heavy equipment, generators, pumps, and the sounds associated with tumblers used to separate the placer deposits may carry cross country for some distance. However, the mountainous terrain typical of the area restricts the sound from traveling long distances and usually cannot be heard for more than a half mile from the mine site.

It is unlikely that users of these sites would experience any conflict associated with any of the mining activity within the analysis area.

Elkhorn Scenic By-Way

Magnolia Group, Buffalo Group, Eddy Shipman, Make-it, Muffin, City Limits, Old Erick 1 &2, Blue Smoke, Blue Sky, and Bull Run proposed operations lie within one-half mile of the Elkhorn Scenic By-Way. Most of these proposed operations would be screened from the By-Way by vegetation; however, a few would be clearly visible to visitors traveling the road.

Both historic and recent evidence of mining are common along the Scenic By-Way. Some historic mining, Ah-Hee Diggings, and the Sumpter Dredge are featured attractions along the By-Way. Dredge pilings are located throughout the area with the most significant evidence in the Sumpter Valley from a bucket dredge that operated between 1913 and 1954.

Implementation of either alternative would increase public awareness of National Forest activities, strengthen the Forest Service image as a multiple-use agency, encourage a land use ethic, and promote an understanding of ecosystem management. All are stated goals of this 1994 Scenic By-Way Management Plan.

Because most of the mining activity within the analysis area would not be visible from the Scenic By-Way, only 10% of the By-Way is within the analysis area, and evidence of mining is and has been commonly seen along the route, no measurable effects are anticipated from the implementation of either alternative.

Wilderness, Inventoried Roadless Areas and Areas Included in the Potential Wilderness Inventory

No operations are proposed within Wilderness, Inventoried Roadless Areas or Potential Wilderness Areas.

Table3-59: Wilderness Attributes and Effects from Alternative 2 and 3

Wilderness Attributes (FSH 1909.12, Ch. 70(72))	Alternative 2 and 3 Effects
<p>Natural– Are the area’s ecological systems substantially free from the effects of modern civilization and generally appear to have been affected primarily by forces of nature. Consider:</p> <ul style="list-style-type: none"> a. presence of non-native species that alter the composition of natural plant and animal communities b. developments that degrade the free flowing condition of rivers and streams c. presence of light pollution that degrades night sky quality and night sky quality related values d. presence of pollutants that degrade water quality e. health of ecosystems, plant communities, and plant species that are rare or at risk 	<p>Alternative 2 and 3 proposes no activity that would degrade the free-flowing condition of rivers and streams, degrade night sky quality or introduce pollutants that degrade water quality, thereby retaining the characteristics of an area that is free from the effects of modern civilization.</p>
<p>Undeveloped – The degree to which an area is without permanent improvements or human habitation. Consider level of human occupation and modification.</p>	<p>Alternative 2 and 3 would retain the undeveloped wilderness attribute with no evidence of human development.</p>
<p>Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation – An area’s capability of providing solitude or primitive and unconfined types of recreation.</p> <p>Solitude is isolation from sights, sounds, and the presence of others from the developments and evidence of humans; consider size of area, presence of screening, distance from impacts, and degree of permanent intrusions.</p> <p>Opportunity to feel a part of nature; to have a vastness of scale; a degree of challenge & risk while using outdoor skills are measures of primitive and unconfined recreation</p>	<p>No conflict with wilderness visitors would occur, therefore there would be no effect to wilderness visitors’ experiences.</p>
<p>Untrammelled - The wilderness is essentially unhindered and free from modern human control or manipulation.</p>	<p>Alternative 2 and 3 would retain the untrammelled wilderness attribute with no evidence of human control or manipulation.</p>

Effects on wilderness recreation would not vary between the two alternatives.

Areas included in the Potential Wilderness Inventory as identified in the Wilderness and Undeveloped Lands Report (Appendix 10)

Table 3-60: Potential Wilderness Areas (PWAs)

Location/Size	Acres
Coincident boundary with wilderness	14,096
Less than 5000 acres	0
Grand Total Acres	14,096

DataSource:

T:\FS\NFS\WallowaWhitman\Project\whitGraniteMining2009\GIS\Workspace\edreher

Operations located in PWAs adjacent to wilderness (regardless of PWA acreage):

- Hopeful 1, 2, and 3
- Ruby Group
- Bunch Bucket
- Grubsteak

The above identified operations overlap into PWAs. These mine sites are areas of significant current mineral activity, including prospecting with mechanical or motorized equipment. Mining activity at these sites has been ongoing for several years dating back to the 1980's. There is also significant evidence of historic mining dating back to the 1800s, when dredging and hydro-mining were common. Access roads, structures, dredge piles, and adits exist at all these sites. The Hopeful claims all have cabins and Ruby also has a cabin. These improvements would not meet the criteria for inclusion within a PWA (FSH 1909.12, 71.11). These operations are located along the perimeter of polygons that meet the criteria for Potential Wilderness (Refer to maps in Appendix 10). Excluding these mine sites would not disqualify the remaining area for possible wilderness inclusion based on the criteria in FSH 1909.12.

Alternatives 2 and 3 meet to the requirements in Forest Service Handbook 1909.12 CH. 71.11-Wilderness evaluation.

FSH 1909.12, 71.11:

Evidence of historic mining (50+ years ago). **Do not include areas of significant current mineral activity, including prospecting with mechanical or motorized earthmoving equipment.** The inventory may include areas where the only evidence of prospecting is holes that have been drilled without access roads to the site. Potential wilderness also may include:

- a. Areas that otherwise meet inventory criteria if they are covered by mineral leases having a "no surface occupancy" stipulation.
- b. Areas covered by mineral leases that otherwise meet inventory criteria only if the lessee has not exercised development and occupancy rights. If and when these rights are exercised, remove the area, or portion affected, from the inventory unless it is possible to establish specific occupancy provisions that would maintain the area in a condition suitable for wilderness.

Alternatives 2 and 3 meet the above criteria which specifically excludes active mining sites for consideration as potential wilderness. Each site has evidence of significant current and historic mineral activity, and road access.

Special Interest Areas

No proposed operations are located in Vinegar Hill, Twin Mountain Roadless Area, Greenhorn Mountain Roadless Area, Olive Lake - Fremont Powerhouse, Vinegar Hill RNA, Greenhorn Historical Area, North Fork John Day Wild and Scenic River, or the Ah Hee Diggings. Because the proposed operations are not located within or adjacent to any of these special areas, no measurable effects are anticipated by implementing either Alternative 2 or 3.

The following proposed operations are located within or adjacent to the Special Fish Management Area:

- Lucky Strike
- Altona
- Yellow Jacket 1,2,3
- Lightning Creek
- Bunch Bucket
- Grubstake
- Ruby Group
- Hopeful 1,2,3
- East Ten Cent Creek
- Make It
- Magnolia Group.

The type of recreation anticipated for this Special Interest Area would be what normally occurs in dispersed or undeveloped areas of the Forest. These effects will be discussed in the Dispersed Recreation area section.

Other effects of the alternative on recreation use, opportunities and facilities would be the same as Alternative 1.

Direct and Indirect Effects of Proposed Mining Activities (Alternatives 2 & 3)

Indicator Measure 2: *An evaluation of the type of recreation anticipated to occur in the project area that potentially will occupy the same area at the same time.* The evaluation will identify any conflicts with the ability to conduct a specific recreation activity as a result of mining activity.

As mentioned above, recreational conflict is defined as “goal interference attributed to another’s behavior” (Jacob and Schreyer, 1980). Anytime people with different goals meet on the same landscape conflicts can occur (Giroux).

Developed recreation, as described above, and the Scenic By-Way would not be affected by either alternative. Throughout the remaining area, the anticipated recreational activity would be what is typical of undeveloped areas such as camping, motorized travel, big-game hunting, and hiking. In

addition, driving for pleasure, picking mushrooms or berries and fuelwood gathering may occur in these areas.

The assumption is that mining and the recreational activity would occur at the same time and be at or near the same place. Therefore, the evaluation will focus on the type of recreational activity and if the mining would affect the ability to conduct any certain activity.

Dispersed Recreation

There are no restrictions to access of mining sites for activities that do not materially interfere with mining, and typically the recreational activities listed above would not interfere. For public safety reasons, and the public's reluctance to enter into an active operation, mine sites are generally avoided. With the exception of fishing, activities that use general forest areas like picking berries and mushrooms, gathering firewood, and hunting may encounter conflicts. Driving for pleasure, hiking on trails, camping in dispersed sites, and other motorized travel should not be limited by mining operations. However, because the proposed operations occupy a small area, and the surrounding area provides significant opportunity to enjoy all the recreational activities common in the area, any effects would be minimal. Since the area would remain open and available for these activities, the difference between the level of current activity and when the mines become operational cannot be measured.

Fishing as a dispersed activity will not be affected by any of the alternatives. The State has closed Granite Creek and all its tributaries to year-round fishing (2013 Oregon Sport Fishing Regulations, pg. 73 under Special Regulations for the Northeast Zone). Fishing is often related to other recreational activity in the area such as camping and hiking. Therefore, regardless of which alternative is selected, without fishing as an attraction, dispersed recreational activity within this area is expected to be lower.

Recreation Opportunity Spectrum (ROS)

All but six of the proposed operations are located within ROS Roded Natural, three are located in Roded Modified. Roded Natural recognizes that mineral exploration and extraction is an appropriate activity and Roded Modified allows a full range of management and use activities. The mining operations proposed within these areas do not limit the range of recreational opportunities that typically occur within these settings. One operation, City Limits, is located within an ROS class of Rural. A Rural setting is typical of a developed area. In this case the operations are located adjacent to the town of Granite. Though recreational activities do not specifically occur in this area, recreationists are accustomed to the services available at Granite. Because of the high level of development in and around Granite, the sights and sounds of a small operation will not detract from the recreational experience.

One operation, Ruby Group, is proposed within the ROS class of Semi-primitive Motorized. The proposed mining meets the objectives described for this setting. The miner has proposed the use of high clearance vehicles and ATVs over primitive roads, and little vegetation would be removed. However, operations would occur at the same time as the public use season. Because Ruby creek is an intermittent stream and no trails or other recreational improvements are located near the site, the primary recreational activity is limited to big game hunting. There is also a cabin located at this site that has been in use on an intermittent basis since the 1920's. Because of the short time period that

hunting would occur while mining is conducted, and generally hunters are more tolerant of other uses of the land, no measurable impacts to this activity are anticipated.

Off Highway Vehicle (OHV) travel

On the Umatilla National Forest OHV travel is limited to designated roads. Several of the mine sites are accessed by roads closed vehicle traffic. These restricted roads can only be used by the miner incident to his/her mining. Conversely, the Wallowa-Whitman National Forest is open to OHV travel except in areas closed, such as the North Face Vehicle Closure area. Use surveys indicate that approximately 24% of the visitors use General Forest Areas and approximately 1.5% of visitors surveyed (NVUM 2009) indicate OHV use as their primary activity with only 2.6% indicate participating in OHV use during forest visits.

Most of the observed OHV travel within the area is associated with hunting. Hunting season begins in the late summer early fall. At that time of the year mining operations begin to shut down. There is the potential for some interaction. However, with mining operations slowing down at this time of the year, potential conflict between these two activities should be minimal.

Because of the low use by OHV's in this area, and no additional travel restrictions will be imposed by selection of any alternative, there will be no measurable effects to OHV travel related to user conflicts.

Cumulative Effects of Proposed Mining Activities (Alternatives 2 & 3)

Long-term timeframe: 25-30 years because climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this timeframe speculative.

Spatial Boundary: Granite Creek Watershed

The cumulative effects analysis area for recreation is the same as the Granite Creek Watershed Mining analysis area. The effects are the same for all alternatives. Past, present and future activities listed in at the beginning of this Chapter that overlap the proposed mining operations in time and space include use and maintenance of dispersed campsites, OHV travel (on and off road), and vehicular use of native surface roads. These activities occur continuously throughout the summer season and could occur at the same time that mines are in operation.

Ongoing recreation activities can directly affect soil compaction, loss of vegetation within riparian areas, and the potential of activity-generated sediment into area streams, caused by the use of dispersed campsites or by vehicle use of native surface roads. This may indirectly affect water quality. However, at the current level of recreation use, 13% reported the recreation activities common to General Forest Areas as their primary activity, 2009 NVUM, and the relatively small area of potential disturbance, recreation activities in this area do not have a measurable cumulative effect on water quality.

Summary of Effects Analysis for all Alternatives

Mining within the area does not preclude other legitimate uses of the Forest. Mining rights do not grant exclusive use of the land. Some mining sites may be gated to protect personal property or provide public safety. However, recreational use of the land is not prohibited. Mining in its present

form in this area has not changed for many years. Operating Plans have been approved for the level of activity considered in the proposed action described in Alternatives 2 and 3 at many of these sites going back to the early 1980's, and there is no evidence of interference or conflict with either users.

For the reasons listed above, there would be little to no effect, adverse or positive, on the existing recreation use patterns, and opportunities as described in the Affected Environment section by implementation of Alternatives 1 through 3. Due to the very slight difference in mining operations approved under any alternative, these alternatives do not change the current condition.

Alternatives 2 and 3 would authorize the use of approximately 9 miles (less under alternative 3) of closed roads for mining access. The majority of these roads are currently being used by the miner's to access their sites. Controlled use by the miner would be allowed, with requirements to maintain the roads to prevent sedimentation problems (Appendix 2, General Requirements). Opening the roads would not alter the use by the general public because the miner would be responsible for closing the roads during seasonal shutdowns (Appendix 2, General Requirement Z12).

Compliance with the Forest Plan and Other Direction

Though a majority of the Forest Standards and Guidelines outline agency actions related to managing the variety of recreational activities found on the Forest and within the project area, the specific activities that reflect the interaction between recreation and the proposed action of authorizing mining are as follows:

Umatilla Forest Plan

1. In all management activities, incorporate recreation considerations to enhance the quality of opportunities and positively affect use.
2. Provide Forest recreationists with freedom of choice in selecting sites, areas, routes, and activities to meet their recreation needs.
3. Priority will be placed on preventing conflicts among users by good communications and providing information to affected people. Indirect management actions (i.e., design, education, information, etc.) will be preferred over direct actions (i.e., restrictions, enforcement, etc.). Generally, recreation conflicts will be resolved in order of priority: (1) Public safety, (2) wise use of resources, (3) retention of or increased wide spectrum of opportunities, (4) prevention or filling of recreation opportunity voids, and (5) relation to the surrounding environment.
4.
 - a) Incorporate an integrated ecosystems approach, the special appeal of the Blue Mountains, Scenic Byways and Corridors Management (roads, trails, and rivers) into Forest recreation planning and management. Coordinate with adjacent landowners to achieve a continuity of management along corridors and areas.
 - b) Identify the potential of any proposed activity to change Recreation Opportunity Spectrum (ROS) classes in all project environmental analyses.

Wallowa-Whitman Forest Plan

1. Use the Recreation Opportunity Spectrum (ROS) to inventory the array of recreation opportunities on the Forest and to guide management of the physical, social, and managerial settings.
2. Recreation Opportunity Spectrum. Provide a full range of recreation opportunities, except urban, as described in the Recreation Opportunity Spectrum (ROS) and outlined in the National Recreation Strategy.
3. Location and design standards for, and construction of, new or reconstructed roads and trails will accommodate user developed occupancy spots at locations and quantities appropriate to the planned ROS experience level.

With the exception of Hopeful 1, 2, & 3, Ruby Group, Eddy Shipman, and Make-It proposed operations, all mine sites are within ROS Roded Natural. Hopeful 1-3, Eddy Shipman, and Make-It mine sites are located in ROS Roded Modified. A portion of Ruby Group is located in Semi-Primitive Motorized.

The Standards and Guidelines of the Umatilla Forest Plan states “Identify the potential of any proposed activity to change Recreation Opportunity Spectrum (ROS) classes in all project environmental analyses” (*UNF Forest Plan*, pg. 4-50). The ROS class for both Semi-primitive Non-motorized and Semi-primitive Motorized has conditions for the period of time that mineral exploration should be conducted, limiting operations to the “low public use periods”. This condition would apply to all the alternatives. As stated in the Assumptions, the Multiple Use Act, 30 USC 612(b) allows other uses of the surface of NFS lands, including recreation, provided that “any use of the surface... shall be such as not to endanger or materially interfere with prospecting, mining or processing operations. All the operations propose to mine generally from early spring to late fall, when the area is free from snow. For the same reason, that is when the area receives most use by the public. Limiting mining to low public use periods would materially interfere with mining and be a violation of the Multiple Use Act, 30 USC 612(b). To be consistent with the Multiple Use Act, 30 USC 612(b), this analysis assumes that all alternatives are consistent with the Forest Plan because the Forest Plan suggests that mining “should” be conducted during low public use periods, and not “must” be conducted during low public use periods.

Visual Resources

Introduction

Viewing scenery is a highly sought after recreation activity and it contributes to the local quality of life, recreation, tourism and economic vitality. The scenic quality of the Granite Creek Analysis Area is valued as a state-wide resource as the Blue Mountain Scenic Byway, and the Elkhorn Scenic Byway. These Byways are drawing people from outside of the local area to come for the experience of viewing scenery as an intrinsic value of the area. Local use comes from LaGrande, Baker City, and John Day. The major access routes are Forest Route 51 which links I-84 from Hilgard State Park (via State Highway 244) to the area, Forest Service Road 73, which also links I-84 from the North Powder exit to the area, and also links State Highway 7 to the area via Sumpter.

Forest Service Road 73 provides 3-season passenger vehicle access to local campgrounds, trailheads and the Anthony Lakes Ski resort. Scenery resources from this route include a mixed conifer forest canopy over steep mountain terrain. High mountain peaks are the key scenic element of this route. Forest Route 51 provides access to campgrounds, trailheads and wilderness experiences. From this route the scenic resource is a park like river valley until the route climbs up into the headwaters of the Grand Ronde River, where the landscape becomes more mountainous, with views limited by dense lodgepole pine. Where views open up, the scene is of a mixed conifer forest on steep slopes and long ridges.

This evaluation applies the current National Forest Landscape Management methodology. Currently, Visual Quality Objectives identify the degree of disturbance allowed in specific areas related to the scenic attractiveness, concern level, and the distance from which the area is seen from particular routes. Scenery Management is also evaluated by the methodology of Agricultural Handbook #701 Landscape Aesthetics, Scenery Management Handbook. Visual Quality Objectives are similar to Scenic Integrity Objectives and are therefore in this analysis considered synonymous. Scenic Integrity Objectives can be found in the Visual Resources specialist report in the project file.

The Visual Quality Objectives (VQO) that would limit or impact mining operations of the scale in this analysis is Preservation, Retention and Partial Retention (defined below). The analysis area includes 23% maximum modification, 51% modification, 12% partial retention, 2% retention, and 9% preservation. Mining sites are located in areas of retention, partial retention, modification and maximum modification. VQO's for each mine site can be found in the Visual Resources specialist report in the project file.

Retention- management activities are not visually evident. Activities may only repeat form, line, color, and texture which are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern, etc., should not be evident.

Partial Retention- management activities remain visually subordinate to the characteristic landscape. Activities may repeat form, line, color, or texture common to the characteristic landscape but changes in their qualities of size amount intensity direction, pattern, etc., remain visually subordinate to the characteristic landscape.

Modification- management activities may dominate the original characteristic landscape. However, activities of vegetative and landform alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type.

Maximum Modification- Allows management activities of vegetative and landform alterations may dominate the characteristic landscape. However, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character type. When viewed as foreground or middle ground, they may not appear to completely borrow from naturally established form, line, color, or texture. Alterations may also be out of scale or contain detail which is incongruent with natural occurrences as seen in foreground or middle ground.

Table 3-61: VQOs by acreage and percentage of analysis area

VQO		Acres	Analysis area %
Modification		48513.79	51.35%
Partial Retention		11799.34	12.49%
Retention		1901.44	2.01%
Preservation		8604.42	9.11%
Maximum Modification		21847.77	23.12%
	Total:	92666.76	98.08%

Regulatory Environment

The following statutory authorities and Federal regulations in FSM 2380.11 - 2380.19 provide for management of landscape aesthetics and scenery within the National Forest System: The Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528; The Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976 (16 U.S.C. 1601); 36 CFR part 219, subpart A; 36 CFR part 251, subpart B; 36 CFR part 223. Detailed descriptions of these statutory authorities and regulations can be found in the Visual Resources specialist report in the project file.

Forest Plan

Wallowa-Whitman National Forest Plan: Forest-wide Standards & Guidelines (1990)

The following list of standards and guidelines are a subset of all applicable Land and Resource Management Plan (Forest Plan) direction and this project is being analyzed for consistency to all applicable Forest Plan standards and guidelines for **Landscape Management**.

Forest Management Objectives: Landscapes

The visual quality objectives summarized in Table 4-1 will maintain the natural appearance of landscapes seen from major travel routes and recreation sites. Other lands outside of wilderness will appear somewhat modified to heavily modified by timber activities.

Goal

To manage all National Forest lands to obtain the highest possible visual quality, commensurate with other appropriate public uses, costs and benefits

Standards and Guidelines

1. **VQO's.** Meet visual quality objectives through management techniques described in National Forest Landscape Management, Volumes 1 and 2, and the Wallowa-Whitman National Forest Visual Management Plan - Desired Visual Model (maps showing visual objectives are available at the Forest Headquarters in Baker City). See also maps of Level I and Level II viewsheds in the FEIS.
2. **Retention Foreground.** In retention foregrounds the area regenerated per decade should not exceed 7 percent or less than 3 percent of the suitable forest land within the viewshed. Maximum seen area disturbed should not exceed 10 percent¹⁰ within any viewshed. Limit regeneration unit size to that which meets retention and desired character including consideration for future entries and regrowth. The approximate range of sizes necessary to accomplish this is 1/2 to 2 acres in the immediate foreground (less than 500 feet) and 3 to 5 acres in the foreground greater than 500 feet from the road or trail. Units against road or trail edges should be shelterwoods or selection cuts rather than clear-cuts. Target tree size is 36 inches where biologically feasible.
3. **Partial Retention Foreground and Retention Middleground.** In partial retention foreground and retention middleground, the area regenerated per decade should not exceed 9 percent or be less than 5 percent of the suitable forest land within any viewshed. The maximum seen area disturbed at any one time should not exceed 14 percent of any viewshed. Limit regeneration unit size to that which meets partial retention and desired character including consideration of future entries and regrowth. The approximate range of sizes necessary to accomplish this is 1/2 to 2 acres in the immediate foreground (less than 500 feet) and 3 to 5 acres in the foreground greater than 500 feet from the road or trail. Target size tree in foreground is 26 inches, where biologically feasible.
4. **Partial Retention Middleground.** In partial retention middlegrounds, the area regenerated per decade should range between 8 and 10 percent. Limit maximum regeneration unit size to 10 acres. Maximum area disturbed at any one time should not exceed 20 percent.
5. **Created Openings.** Consider a created opening is to no longer be an opening, visually, when trees reach 20 feet in height. Rotation periods will be sufficient to grow large tree character in viewshed foregrounds.
6. **Resolving Conflicts.** Where conflicts develop between visual quality objectives and timber or range management objectives, these conflicts will be resolved in favor of meeting the visual objectives. Where conflicts occur between old-growth objectives and visual objectives, old growth will have priority.
7. **Viewshed Plans.** Plans will be prepared for all Level I viewsheds that will refine boundaries, establish project design criteria, identify opportunities for scenic enhancement, and set entry priorities and timing.

¹⁰ All Visual Resource percentages quoted in the VQOs apply to regeneration harvest. Not applicable to intermediate cuts, over story removals, or individual tree selection harvest.

Desired Condition

The desired condition for scenery is to manage all National Forest System lands to obtain the highest possible visual quality, commensurate with other appropriate public uses, costs and benefits (WWNF Forest Plan, page 4-42). The goal of scenery management is to a) minimize immediate impacts to scenery, and b) restore landscapes to a sustainable condition.

Vegetation

A mosaic of vegetation patterns across the slopes, rock formations and views of the rivers and streams punctuate the corridor, along with distant views to background landscapes. Deciduous vegetation along the riparian corridor provides ribbons of color adding color diversity. Openings are shaped in a manner that appears natural, free form, with no straight lines, and feathered edges that don't appear unnaturally abrupt.

Cultural Elements

The area has a rich history of mining. Historic mining structures are interpreted in a manner that enables the visitor to "see" into the past and discover the heritage of the area. Existing mining structures are kept in such a manner that is orderly and unobtrusive or contrasting to the natural landscape. Screening from the most used viewing areas eliminates the mining operation effects to the view. The structure's appearance is rustic and/or harmonizes with the surrounding setting.

Recreational Elements

The recreational facilities are of consistent design, derived by the natural setting and portraying strong design principles. Recreational sites fit the site well and accommodate visitor needs in a way that harmonizes with the landscape.

Umatilla National Forest Plan: Forest-wide Standards & Guidelines (1990)

The following list of standards and guidelines are a subset of all applicable Forest Plan direction and this project is being analyzed for consistency to all applicable Forest Plan standards and guidelines.

Forest Management Goals

Provide attractive natural to near-natural settings for Forest users along important highways, roads, trails, and in and around developed and primitive sites.

Visual Resource

In total, about 26 percent of the Forest, outside of wildernesses, will be managed to provide a natural to slightly altered visual appearance. This equates to a partial retention visual standard, as described in the Landscape Management Handbook. Lands managed to meet the standards include unroaded areas, old growth stands, and some riparian areas where timber harvest is restricted. Other areas are viewsheds and some riparian areas where timber management and harvest are designed to maintain or

produce a large-tree appearance. All wildernesses will be managed to the visual quality standard of preservation.

The visual quality objectives of retention and partial retention are emphasized in viewshed, which include state highways, key Forest travel routes, and major water features. In the viewsheds, modification may be used on the background distance zones which have minimal variety. Viewsheds will be managed to the specifications of the A3 and A4 Management Areas as identified on the Forest Plan map. Forest Plan table 4-5 displays visual management intent for each inventoried viewshed¹¹.

Viewshed corridor management plans for sensitivity level 1 and 2 viewsheds will be developed according to direction, and will specify vegetative manipulation guidelines to attain the desired forest character. The plans will indicate scheduling and amounts of timber harvest needed to maintain or enhance long-term visual characteristics.

Although about two-thirds of the Forest, outside the wildernesses, will eventually be modified, activities will be designed to borrow from naturally established form, line, color, and texture so that the affected areas may eventually resemble natural occurring ones. Modified silvicultural systems and techniques will also be used to help minimize impacts to visual quality.

The principles contained in Volumes 1 and 2 of the National Forest Landscape Management Handbook, and other published handbooks within the Visual Management System (Utilities, Range, Roads, Timber, Fire, and Ski Areas) will be used to manage the visual resource.

A3 Viewshed 1

Goal

Manage the area seen from a primary travel route, use area, or water body, where forest visitors have a major concern for the scenic qualities (Sensitivity Level 1) as a natural appearing landscape description.

The strategy applies to all or parts of the defined Sensitivity Level 1 travel routes, use areas, or water bodies. Sensitivity levels are defined in the Umatilla National Forest landscape management text, and viewshed boundaries are defined on the Forest Visual Quality Objective (VQO) maps.

The following defined viewsheds, or parts of viewsheds, are included in the management area:¹²

- 10. Forest Road 73 (Forest Road 52 to Forest Boundary) (NFJD);
- 13. Forest Road 10 (Olive Lake east to Forest Boundary) (NFJD).

Desired Future Condition

Viewsheds will be managed primarily to meet the visual quality objectives of retention and partial retention. An attractive, natural appearing landscape will be created or maintained. A maximum of three distance zones for each viewshed, including foreground, middle ground, and background radiating from the viewer position (and a visual quality objective for each zone), have been delineated according to the process defined in the Agriculture Handbook 701.

Management activities will be done with the highest sensitivity to people's concern for scenic quality. Vegetative manipulation will be conducted so that Forest management activities are not usually

¹¹ Refer to Umatilla Land Management Plan for Table.

¹² Only those identified in the Forest Plan located within the Project Area are listed

noticeable in the foreground and remain visually subordinate in the middle ground viewing area. All viewsheds will have vegetative management plans. Timber harvest areas will be sized and shaped to be compatible with the natural surroundings, but harvest may be noticeable in the background. Forest stands will occasionally be logged in order to maintain long-term health and vigor, and to encourage a park-like, natural appearance with big trees in the immediate foreground. Recreational opportunities will be mostly road oriented.

Management Area Standards and Guidelines

Visual

Visual Quality Objective (VQO) will generally be Retention in the foreground and Partial Retention in the middle ground. Exceptions are defined through the process described in Agriculture Handbook 701. Activities within these viewsheds may only repeat form, line, color, and texture which are frequently found in the characteristic landscape. Changes of landscape should be of such size, amount, intensity, direction, and pattern that they continue to provide a natural appearance, except for short-term changes to meet long-term objectives.

Principles of visual management will be applied so that positive attributes of a managed forest can be enjoyed while negative visual aspects of activities will be minimized.

Landscapes containing negative visual elements will be rehabilitated. Landscapes will be enhanced by opening views to distant peaks, unique rock forms, unusual vegetation, or other features of interest.

Viewshed corridor plans will be developed for all Sensitivity Level 1 viewsheds and will guide project activities when completed.

Effects Analysis Methodology

Specific Assumptions

Assumption 1: The highest potential for visual impacts is along the main travel routes (FR 73, 10 and County Road 24) at sites where a significant amount (acre or more) of vegetation will be removed or activities will be clearly visible.

Assumption 2: Based on National Visitor Use Monitoring (NVUM) results from 2009, 20% of the visitors using the National Forest use General Forest Areas. The Granite Creek Watershed is predominately General Forest Area. The analysis area represents approximately 2% of the total General Forest Area identified on the two National Forest. Based on these figures, an estimated 5200 National Forest Visits¹³ annually or an average of 14 visits per day occurs within the analysis area.

Specific Methodology

Indicators

¹³ A National Forest Visit is defined as the entry of one person upon national forest to participate in recreation activities for an unspecified period of time (NVUM, 2009).

Indicator Measure: Proximity of the operations to a main travel route, the level of disturbance proposed, and compliance with VQOs. Currently, Visual Quality Objectives identify the degree of disturbance allowed in specific areas related to the scenic attractiveness, concern level, and the distance from which the area is seen from particular routes.

Timeframe: 1 to 3 years, because historically each operations varies on an annual basis on how long or if they operate. These operations are small and rely on the market value of gold and the cost of operation to determine when and if economically that operations are feasible in a given year. Additionally, all operations have proposed to reclaim all but ¼ acre of disturbed ground on an annual basis thereby minimizing the visual impacts.

Spatial Boundary: The Granite Creek Watershed analysis area. Sights and sounds associated to these small operations are limited to a short distance.

Methodology: Evaluate the magnitude in terms of compliance with VQOs, the duration that alterations to the landscape are expected to last, the extent at which the sites will be viewed.

Duration will be measured in terms of years; short term is considered less than 1 year and moderate is intermittent impacts or limited to 2 or 3 years. The operations have proposed a 10 year term and impacts will be minimal upon successful completion of the required reclamation. The extent of the exposure to visitors is expected to be small with less than 100 people impacted on annual bases to the sights and sounds of the operations.

Affected Environment

Mining Activities

Visual evidence of decades of historic mining activities is evident in this area. A site along the Elkhorn Scenic Byway is known for the Chinese mining that has a vast area of hand-stacked rock walls placed during the mining process. The Sumpter Dredge was in operation in this area up until the 1950's. The tailings left by this activity have been identified as historic features. The existing operations in this area are often in areas that have been previously disturbed, generally in historic mine tailings, and do not appear in stark contrast to the surrounding landscape. To the casual observer travelling the route, the operations are not immediately apparent. In most cases the sites are screened by trees. Some activity may be noted periodically, but the sites do not degrade the integrity of the scenic resources. Most sites are less than five acres in total size. Two sites exceed 10 acres. In many cases, the operations have been inactive for many years. Currently, the proposed mining operations are within the areas of Retention, Partial Retention, and Modification (project file). Total disturbance proposed for all 27 operations represents 104 acres or 0.1% of the entire project area.

Past Harvest and Fire Suppression Activities

The scenery resources in this watershed have been most affected by past harvest and fire suppression activities. Commercial harvests have increased the stand composition of early seral species,

especially lodgepole pine. These areas include dense stands of small-stemmed lodgepole, appearing patchy, uneven and somewhat unnatural. Fire suppression has also contributed to increasingly dense stands and increased fuel loads, making the foreground views appear very dense and cluttered. Visual penetration into these stands is negligible. Middleground and background views include some square and irregular shaped clear cuts. That last harvest activities occurred in 2002 with the last period of significant harvest activity occurring in the early 80's.

Fire suppression activities produce effects to the scenic environment both directly and indirectly. Some firefighting activities, such as mechanical fire line and safety zone construction, can result in direct, long-term effects from vegetation clearing and ground disturbance. In the case of fire line construction, these effects are usually magnified by the linear nature of the pattern of disturbance. In some vegetation types, fire suppression can and has produced vegetative conditions that would not be present had fire occurred at historical levels. Fire exclusion has allowed some late seral or climax forest cover types, such as Douglas fir, to dominate the visual landscape in some locations for longer periods of time than they would without excluding fire. To some extent, this has resulted in landscapes with less visual diversity than what would be present in the absence of fire suppression.

Visual impacts can vary considerably with the magnitude and intensity of the fire. The effects are often dominant on the landscape immediately following the activity and for a few following years. With accelerated regrowth of herbaceous and understory vegetation, the major visual effects are usually temporary and short term. Often these effects are subtler, resulting in more open stand conditions, again depending on the intensity of the fire.

Within the project area there have been two significant wildfires (>1000 acres), both lightning caused and in the John Day Wilderness. The most recent was the Vinegar fire in 2013, totaling 1,315 acres. Within the project area, primarily in the 80's and 90's, an additional 13 lightning caused fires occurred that were less than 1000 acres in size, with 11 less than 300 acres. The total burned area was 5,500 acres in the project area, or approximately 0.06% of the project area. Three operations are located about a mile from any burned area. Hopeful 2&3 is a mile north of the Tabor fire (152 acres in the wilderness, 1986), and Lucky Strike is located about 1 mile east of the Vinegar fire (1350 acres in the wilderness, 2013). The Vinegar fire intensity in the area near the east perimeter was high.

Environmental Effects

Alternative 1 – No-action Alternative

Direct, Indirect and Cumulative Effects of No Action:

There would be no direct effects on visual resources if no action were to take place. Mining activities and would remain at the same level, thus there is no means of estimating the indirect effects of taking no action. The level of operations under this alternative is low impact and typically small. This would be restricted to activities that would not result in a significant impact to surface resources (36CFR 228.4(a)).

The existing sites that lie in areas of retention or partial retention do not currently detract from the scenic resources from Forest Service Road 73. Some structures are visible, but they do not dominate the scene. Sites that lie in areas of modification are currently impacting foreground views at a small scale. Moderate impact is caused by past ground disturbance, structures and equipment. The natural-appearing characteristics of the landscape setting is obviously altered, however, the size of these

disturbances are of such small, limited scale, they meet the modification VQO or Scenic Integrity Level of Low.

Given that there are no measurable direct and indirect effects that would occur under the no action alternative, there would also be no measurable cumulative effects.

Alternative 2 and 3 – Proposed Action and Proposed Action with Best Management Practices.

Direct and Indirect Effects of Proposed Mining Activities (Alternative 2 and 3)

Measurement Indicator: *Proximity of the operations to a main travel route, the level of disturbance proposed, and compliance with VQOs. Currently, Visual Quality Objectives identify the degree of disturbance allowed in specific areas related to the scenic attractiveness, concern level, and the distance from which the area is seen from particular routes.*

Sites in Retention

The following sites are located along FSR 73: City Limits, and Old Erick 1 &2. Old Erick 1&2 would be screened from the road by vegetation; however, City Limits be clearly visible to visitors traveling the road. Hopeful 1 is located on a closed road adjacent to the wilderness.

The proposed activities at these existing sites would have minimal effect to the scenic resources, because the majority of the operations are screened or do not detract from the landscape character.

Although there is evidence of historic mining at these sites that would be visually similar to the proposed action, management direction would be to restore the site to a more natural condition, Activity at the mine sites would not repeat form, line, color, or texture which are frequently found in the surrounding foreground. The disturbance caused by mining would be relatively short term in nature with no more than ¼ acre disturbed at one time before reclamation is required. The three operations listed above total 3 acres of disturbance, or 0.2% of disturbance within the project area with a VQO of Retention.

Because the disturbance represents only a small percentage of the watershed, and reclamation is ongoing and completed annually, the visual impacts are considered short term. This disturbance within the watershed will not substantially alter the landscape character of the area. Visual Quality Objectives allow for short term changes to meet long term objectives (*Agricultural Handbook #701, Umatilla NF Forest Plan*). When reclamation is complete and vegetation is reestablished, the mined area will return to a more natural appearance.

Sites in Partial Retention

The following sites are located on either along FSR 73 or County Road 24/520: Blue Smoke, Eddy Shipman, Make-It, Old Eric 1&2, Rosebud 1-4, Blue Sky-Bull Run, and Troy D.

Blue Sky-Bull Run is located on County Road 24 and their operations will be clearly visible from the Scenic By-Way. This operation will alter the foreground visual landscape by a modification of the vegetation. The miner will clear all vegetation from three areas, each approximately ½ acre in size. The size of the clearings meet Forest Standards and Guidelines which limit disturbed areas to less than 14% of the viewshed and limits areas of clearing to an approximate range of ½ to 2 acres within 500 feet of a road (this objective is specific to timber regeneration units). The dominate view for travelers along the Scenic By-way at this location is Middle Ground and Foreground. VQ Objective is the same for both views. This area of the By-Way show evidence of past timber harvest with openings in various stages of regeneration. Travel views of motorist are either Northwest or Southeast, depending direction of travel with the mine sites located perpendicular to direction of travel. Terrain and vegetation limits the view of these sites to less than half a mile of travel. These sites will be evident but will not visually dominate.

Eddy Shipman proposal includes continued underground mining at one site, and milling using an arrastra. These activities are expected to meet partial retention, because the majority of the operations are screened and/or are visually evident but are not dominant.

Those proposed activities at sites lying in areas of modification are expected to continue to meet the modification objective or low scenic integrity level.

Sites in Modification

The remaining proposed operations are located in Modification or Maximum Modification VQO Categories. These operations are not located along main travel routes, listed above. The VQO objectives will be attained when mining at each site is completed. The required reclamation for each site will return the disturbed areas to the surrounding area character type. The re-contouring and re-vegetation required at each site will match the visual characteristics of the surrounding area. The limited scale of each operation will not visually dominate the landscape. The surrounding natural landscape will continue to be the prevailing visual feature.

Cumulative Effects of Proposed Mining Activities (Alternative 2), and the Proposed Action with Best Management Practices (Alternative 3).

Timeframe: 1 to 3 years, because historically each operations varies on an annual basis on how long or if they operate. These operations are small and rely on the market value of gold and the cost of operation to determine when and if economically that operations are feasible in a given year. Additionally, all operations have proposed to reclaim all but ¼ acre of disturbed ground on an annual basis thereby minimizing the visual impacts.

Spatial Boundary: The Granite Creek Watershed analysis area. Sights and sounds associated to these small operations are limited to a short distance.

The cumulative effects analysis area for scenery is the viewshed from County Road 24 and Forest Service Road 73.

The primary past activities are vegetation treatments, such as thinning and burning. These activities reduce tree density, and have altered visual aesthetics in the short term. Overtime, the landscape visual experience will change, and eventually scenic integrity with these past actions will be enhanced as large-diameter trees develop.

Present activities (other than mining) continue to be vegetation management. Implementing Forest Plan standard and guidelines, and Best Management practices limit the effects to scenic integrity on federal land.

The cumulative effects analysis area for scenery is the viewshed from Grant County Road 24, Forest Service Road 73 and 10. These routes are designated concern level one routes are used as viewing platforms by the majority of the public. In this viewshed there is visual evidence of past even-age harvests that have created unnatural appearing geometric shapes on the landscape. Private land harvest activities, primarily single-tree removal and fuel reduction thinnings, have been limited to approximately 300 acres within the watershed over the last 15 years. Other ongoing and expected or reasonably foreseeable actions and operations (as listed at the beginning of this chapter) would not be expected to cause measurable visual impacts. No project-related activities would occur to alter landscape aesthetics.

It is expected however, that there will be naturally-occurring fires in the Granite Creek Watershed, which could open timber stands up, creating a greater mosaic of open pockets and thickets, and/or burn stands that currently screen mining activities from the roads. In the event of stand-replacement fire, depending on timing of such an event, some of the existing and proposed mining sites could become more visible to the public. With no vegetative screening, the project sites that are currently screened from roadway views along Forest Road 73 and County Road 24 would be visible, and would cause greater impact to the scenery resources until vegetation grew to heights that would once again provide screening. This “unveiling” caused by fire, in addition to current impacts of past clear cuts that have created geometric shapes would reduce scenic integrity to low.

Typically, large wildfire do not occur in the analysis area and scenic values should change at a gradual rate as undergrowth and fuel accumulations continued. Trees in the previous even-age harvests areas would continue to grow, and appear less managed.

Considering the total 104 acres with most of the 28 operations within the 2-5 acres of disturbance from mining activity proposed in these alternatives, along with the additional requirements listed in Chapter 2, Appendices 1A and 2, and with reclamation on going, no measurable cumulative effects to scenery are anticipated for Alternatives 2 and 3.

Summary of Effects

Alternatives 2 and 3 would have minimal effects to visual quality. These effects would be limited by the size of the disturbed areas, the duration of time each site would be visible from the traveling public along the Scenic By-Way, and the requirement to reclaim each site.

Visual impacts of mine sites are typically screened by natural vegetation unless they are visible in the foreground from primary travel routes. The highest potential for foreground views is along the Scenic By-Way. These views are at 90 degrees from the way of travel limiting the exposure to very short durations. The impacts would be further reduced by the required reclamation of disturbed sites. Annually, each site would be re-vegetated with native grasses, and when final reclamation is completed the site would be planted with vegetation appropriate to the site and to original densities. This would limit both the size of the disturbed areas and the duration of the impact. Over time, each mine site would be in various stages of recovery and visually be more representative of the surrounding foreground view.

Compliance with the Forest Plan and Other Direction

Selection of Alternative 1 would not meet WWNF Forest Plan goals to provide for the exploration, development, and production of a variety of minerals on the Forest (*WWNF Forest Plan 4-33*). This alternative would unreasonable restrict operations to the activities described in 36CFR 228 that do not require approval in a Plan of Operations. In most cases, this would not allow for full development of the mineral resource. This would unduly restrict the statutory rights afforded under the 1872 Mining Law (as amended) to every citizen to enter and remove valuable minerals from lands open to mineral entry.

Since 1872, an evolving body of legislation and policy has acknowledged, addressed, and directed mineral development on federal lands. The Federal Government's policy for minerals resource management is most succinctly expressed in the Mining and Minerals Policy Act of 1970.

The Forest Service bases its mission to administer mineral resources on that policy. As expressed in the Forest Service Manual, the availability of mineral and energy resources within the National Forests significantly affects the development, economic growth, and defense of the Nation. The mission of the Forest Service in relation to minerals management is to encourage, facilitate, and administer the orderly exploration, development, and production of mineral resources on National Forest System lands to help meet the present and future needs of the Nation.

The Forest Service has both a responsibility and an obligation to manage mineral resources in ways that meet the intent and direction of specific mineral laws and a multitude of other laws affecting management of the Nation's forests and grasslands. Mineral resource development is a valid management responsibility as directed by law and policy, and is crucial to meeting the needs of the Nation and supporting a strong economy.

Alternative 2 complies with federal mining laws but does not meet the Forest Service's regulatory responsibilities to manage resources by minimizing adverse environmental impacts on National Forest System surface resources (36CFR 228).

Alternative 3 meets the Mining Laws, allowing access and extraction of valuable minerals and provides for reasonable measures to protect the impacts to National Forest System surface resources. Implementing this alternative would meet Visual Quality Objectives which allow for activities that are visually subordinate to the landscape (Partial Retention), and for activities that dominate the landscape but borrow from naturally established form, such as natural open areas or previously altered landscapes. As a requirement of reclamation, disturbed sites would meet Partial Retention. The reclaimed sites would be visually subordinate to the characteristic landscape within 3-5 years.

Social and Economic

Introduction

The Granite Watershed is located in the northeast corner of the Grant County which covers much of the southwestern part of the Blue Mountain region of northeastern Oregon.

Mining History

Early federal minerals legislation encouraged the settlement and economic development of western lands. The General Mining Law of 1872 opened the public domain to mining activities. Its stated purpose was to encourage and promote mineral development. This law authorized miners to locate mineral claims on public domain lands. Eventually, if certain conditions were met, the United States conferred title to the land within the claim to the miner. With the exception of the town of Granite, this type of patented land makes up a significant proportion of the private lands within the Granite Creek Watershed.

The history of gold mining in Grant County began soon after the initial discoveries of placer gold at Griffin Gulch in 1861. Discoveries were also made at Sumpter and Canyon Creek, and by 1864 nearly all the mining districts of the Blue Mountains area were known (Lindgren, 1901, p. 563-564). The important gold-producing districts in Grant County were the Canyon Creek, Granite, Greenhorn (partly in Baker County), North Fork, Quartzburg, and Susanville. All of Granite and a portion of Greenhorn mining district were located in the Granite Creek Watershed.

From 1880 to 1899, Grant County produced \$3,022,564 (about 146,000 ounces) in gold (Lindgren, 1901, p. 573). From 1904 through 1957 it produced 77,840 ounces of lode gold, 226,835 ounces of placer gold, and 19,967 ounces undifferentiated as to source. Approximate total gold production through 1959 was 470,600 ounces. (*A. H. Koschmann and M. H. Bergendahl - USGS 1968*)

As early as 1862 placer gold was mined from the gravels of Granite Creek, Clear Creek, and Bull Run; in 1874 lode mining became commercially important when the Monumental and La Belleview mines, the most productive lode mines in the district, were discovered. Much of the early placer mining was done by the Chinese, who at one time outnumbered the Americans (Lindgren, 1901, p. 686). From World War II through 1959 the district was virtually idle with the exception of the Buffalo mine which supplied nearly all the lode gold mined in eastern Oregon during that period (Koch, 1959, P.I).

Koch (1959, p. 38) estimated the total lode production of the Granite district to be \$1,800,000, most of which was in gold and in small amounts of silver. This would represent, conservatively, about 75,000 ounces of gold. Recorded lode production for the district from 1904 through 1959 was 37,250 ounces. Placers yielded \$1,033,000 in gold through 1914 (Oregon Dept. Geology and Mineral Resources, 1941, p. 40). Recorded placer production from 1904 through 1959 was 34,080 ounces and total gold production for the district was about 160,000 ounces.

Placer production was at its peak from 1863-1866. Placer mining began to decline about 1890 as the richest placers were worked out. But the placer operations had uncovered many rich veins, and lode mining began in earnest. Records show 2,000 people received their mail at Greenhorn at the height of the hard rock mining boom in 1902. By 1911 lode mining was on the decline, but a new gold rush began with the advent of bucket line dredges. The Burnt River was mined using a floating bucket line

dredge, and smaller streams such as Pinus, Camp, and Jackknife Creeks were mined using doodlebugs or dragline dredges. Dredge tailings composed of boulders and large rock piled up behind these dredges and covered the topsoil, which settled to the bottom.

Closure of precious metals mining combined with increased operating costs and a fixed gold price precluded the reopening of all but a few mines after World War II (*WWNF Forest Plan*, pg. 2-15). By 1957 the large bucket dredge operations had shut down. Inflation and high gold prices in the early 1980s caused renewed interest in gold mining and increased activity. The potential exists for many more years of removal of gold, silver, and other precious metals from both hard rock and placer deposits by small-scale mining operations like those currently taking place. There is also potential for reclamation of past disturbances.

Economics

A comprehensive economic efficiency analysis requires that all economic benefits and costs be identified and compared. Quantifiable economic information on the benefits of the alternatives that would result in improved environmental conditions for the Granite Creek Watershed is not available; for example, the flow of economic benefits from reducing the production of sediment is not readily definable. However, economic costs and benefits relative to the mining operations can be estimated, based on the equipment in use or proposed to be used, the estimated rates of exploration or production, the cost of any additional operating requirements included in the alternatives, and the reclamation required to be done upon completion of mining activities – both seasonal and permanent. The miners' personal income benefits from these mining operations are also not available, as the Forest Service does not receive reports on the quantity and quality of gold and other marketable minerals recovered.

Expenses of mining, would likely find their way into the local economy which would be positive. The possibility does exist that some of the proposed operations would not operate. Expenses may render their deposit as uneconomical at today's precious metal market prices. However, it is not feasible to attempt to predict how many, if any would not mine, because full marketing evaluations of each of these deposits is beyond the scope of this analysis, and therefore an economic determination cannot be made by the Forest Service for each individual operation. Therefore, to determine the potential economic effect, this analysis will evaluate and compare between alternatives only the operating cost to mine one half acre of placer deposits.

Although five operations propose lode mining, only two propose to operate at small production levels. Royal White is the only operation that proposes lode mining exclusively. The other four propose a combination of placer and load. The cost associated with lode mining are generally higher than placer mining. Load mining as proposed in this analysis is not measured by acre of material processed. Because this type of operation only represents a small percentage of the proposed operations, the similarity of these operations to the placer operations, i.e. labor, time per day and length of season, and equipment used, there is not a measurable difference between the two types of operation on the economic contribution.

Regulatory Environment

Federal Laws

Many laws, regulations, policies, and plans direct the Forest Service to support and facilitate mineral extraction while protecting surface resources to the extent possible.

The **1872 Mining Law** states that all valuable mineral deposits in land belonging to the United States are to be free and open to exploration. Under this law, a mine locator “shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations and of all veins, lodes, and ledges throughout the entire depth.”

The **Organic Administration Act of 1897** grants authority to the Forest Service to regulate surface resources of National Forest System lands.

The **Multiple Use Mining Act of 1955** directs that any mining claim located after July 23, 1955 shall not be used, prior to issuance of patent, for any purposes other than prospecting, mining or processing operations and uses reasonable incident thereto, and that such claims shall be subject to the right of the United States to manage and dispose of the vegetative surface resources thereof and to manage other surface resources thereof, and right of the United States, its permittees, and licenses, to use so much of the surface thereof as may be necessary for such purposes or for access to adjacent land.

The **Mining and Mineral Policy Act of 1970** directs the Federal Government to foster and encourage private enterprise in the development of economically sound and stable industries, and in the orderly and economic development of domestic resources to help assure satisfaction of industrial, security, and environmental needs.

The **National Forest Management Act of 1976 (NFMA)** recognizes the fundamental need to protect and, where appropriate, improve the quality of soil, water, and air resources. The Act also recognizes the interrelationships between and interdependence within renewable resources.

The **Federal Land Policy and Management Act of 1976 (FLPMA)** states that public lands will be managed recognizing the need for domestic sources of minerals.

The **Forest Service Surface Use Regulations (36 CFR Part 228, Subpart A – also known as the 228 Regulations)** set forth rules and procedures for use of the surface of National Forest System lands in connection with mineral operations. The regulations direct the Forest Service to prepare the appropriate level of NEPA analysis and documentation when proposed operations may significantly affect surface resources. These regulations do not allow the Forest Service to deny entry or preempt the miners’ statutory right granted under the 1872 Mining Law. The regulations require the Forest Service to develop measures to minimize adverse impacts on National Forest resources. The 228 regulations include requirements for reclamation.

The **Forest Service Manual (FSM) 2800** discusses specific responsibilities and considerations for dealing with Plans of Operations. It states that the Forest Service should minimize or prevent adverse impacts related or incidental to mining by imposing reasonable conditions that do not materially interfere with operations. It also requires the Forest Service to evaluate proposals for road construction and reconstruction and consider alternatives that may be less damaging to surface resources (*FSM 2817.25*).

The Forest Service direction also includes the **National Environmental Policy Act of 1970 (42 U.S.C. 4332)**, the **Council of Environmental Quality regulations (CEQ) at 36 CFR 800**; the **Federal Water Pollution Control Act (Clean Water Act)**; and the **Clean Air Act** as amended.

The Mining Law Administration program is managed by the Bureau of Land Management (BLM) as authorized by the Secretary of the Interior, and involves recordation, maintenance (annual assessment requirements), and mineral patents. Joint administration of the mining laws on National Forest Systems lands is provided for in a Memorandum of Understanding (MOU) between the BLM and

Forest Service. The purpose of the MOU is to ensure coordination between the general surface resource management of the Forest Service and the administration of the mining laws by the BLM.

Wallowa-Whitman National Forest Plan

The 1990 Wallowa-Whitman National Forest Plan (WWNF Forest Plan) Goals for minerals are:

- To provide for exploration, development, and production of a variety of minerals on the Forest in coordination with other resource objectives, environmental considerations, and mining laws.

The WWNF Forest Plan includes the following Minerals Standards and Guidelines (*WWNF Forest Plan*, pg. 4-33):

11. Access. Permit claimants reasonable access to their claims as specified in the United States Mining Laws.
12. Operating Plans. Require operating plans in accordance with 36 CFR 228 Subpart A when operations are proposed, which involve significant disturbance of the surface resources.
13. Operating plans will include reasonable and operationally, feasible requirements to minimize adverse environmental impacts on surface resources.
14. Analyze operating plan proposals and alternatives, including alternatives for access, reclamation, and mitigation, using Forest Service NEPA process.
15. Reclamation. Develop reclamation standards using an interdisciplinary process to ensure lands are in productive condition to the extent reasonable and operationally feasible. Reasonable opportunities to enhance other resources will be considered. Concurrent reclamation will be stressed. Reclamation bonds will be based on actual reclamation costs and formulated using technical and other resource input.
16. Withdrawals. Review all existing withdrawals by 1991 in accord with Section 204(1) of the Federal Land Policy and Management Act (FLPMA) of 1976, except as provided otherwise by law.
17. Recommend areas with mineral potential for mineral withdrawal only when mitigation measures would not adequately protect other resource values, which are of greater public benefit.
18. Conform to Section 204 of FLPMA in withdrawals from entry under general mining laws.
19. Common Minerals. Give priority to use of currently developed common mineral (natural gravel and hard rock) material sources over undeveloped sources. Exceptions will be made when existing sources are unable to economically supply the quality and quantity of material needed or when conflicts with other resource uses are found to be unacceptable.
20. Development of mineral material sites will be done in accordance with 36 CFR 228, Subpart C.

Umatilla National Forest Plan

The 1990 Umatilla National Forest Plan (UNF Forest Plan) includes the following Minerals Standards and Guidelines (*UNF Forest Plan*, page 4-8):

7. Mineral exploration and mineral removal are permitted throughout the Forest except in withdrawn areas.

8. Under the mining laws, claimants are entitled to access to their mining claims. Access for exploration and development of locatable mineral resources will be analyzed in response to a proposed operating plan. A decision on approval of reasonable access will be made as a result of appropriate environmental analysis.
9. When claimants propose mining activities which involve disturbance of the surface resources, a notice of intent and/or a proposed plan of operation must be submitted. The proposal will be processed in a timely manner in accordance with 36 CFR 228.
10. During development of operating plans or plan modifications. Reasonable alternative mitigation measures and/or operating requirements will be developed to define the appropriate stipulations needed to protect other resources while still meeting the objectives of the miner. The test for operating plan requirements is 'reasonableness.'
11. Reclamation standards will be developed using an interdisciplinary process to insure land restoration to a productive condition to the extent reasonable and practicable. When reasonable, opportunities to enhance other resources will be considered. Concurrent reclamation will be stressed. Reclamation bonds will be based on actual reclamation costs.
12. Claims on which application for patent have been made will be examined and conclusion of validity will be presented to the BLM for final action.

Effects Analysis Methodology

Specific Assumptions

Assumption 1: Estimating the cost to mine one half acre will be sufficient to display the economic effects between alternatives.

Assumption 2: The primary area of economic effect from operations in the Granite watershed will be Baker and Grant Counties.

Assumption 3: The cost of operations includes reclamation by the miner.

Assumption 4: An average depth of bedrock for operations in the analysis area is 10 feet. This is based on personal observations over a 20-year period and the limitations on the equipment typically used.

Assumption 5: Based on personal observations and discussions with miners in the area, on the average, only the last two feet above bedrock contain enough values to process.

Specific Methodology

Data Sources

- Bureau of Land Management bond calculation spreadsheet
- Final Environmental Impact Statement, North Fork Burnt River (April 2004)

Indicators

Indicator Measure 1: The effects of the alternative on operating cost.

Short-term timeframe: 5 year (increases in operating cost make assumptions beyond this timeframe speculative.)

Spatial Boundary: Baker and Grant Counties. Typically, miners reside in the area or stay on site while operating. Supplies, materials, and equipment are purchased or serviced locally.

Methodology: The estimated cost of operation based on the Bureau of Land Management Bonding Spreadsheet will be used to display the effects between alternatives.

The decision to be made does not affect the right to access the mineral estate within the project boundary, thus it is assumed that mining would occur under all alternatives. Changes in mineral removal would occur chiefly due to factors outside the control of the Forest Service, such as the value of gold. These changes would occur regardless of the selected alternative. Therefore, the analysis does not make assumptions about variation in mineral removal between alternatives.

Affected Environment

Placer gold is typically sold in one of two forms. Nuggets may be sold to jewelry makers, the general public, or other users directly. An unknown amount of gold production enters the market directly by sales to the jewelry industry, and thus, may never be reported as typical production from some small operations. Individual pieces are typically assessed an additional charge or "nugget bonus" in addition to the gold market price. Placer gold may also be smelted, and pass into the market through the same route as lode-mined gold (U.S. EPA 1988b).

According to U.S. Bureau of Mines statistics, placer mines have historically produced approximately 35 percent of the total U.S. gold production. However, while net gold production has increased annually in recent years, placer production has decreased as the readily accessible deposits have been mined out and improvement in heap leaching technology have increased. Placer mines produced only two to three percent of the total U.S. gold production during the period from 1984 through 1989; in 1990 and 1991, placer production accounted for approximately one percent of the U.S. total. According to Bureau of Mines statistics, placer mines produced 2,888 kg of gold in 1991 while total U.S. gold production was approximately 289,885 kg (U.S. DOI, Bureau of Mines 1988a; U.S. DOI, Bureau of Mines 1992a; Lucas 1992).

The economics involved in mining a deposit is dependent on factors including the cost of fuel, interest rates, and the market price of gold. These factors are variable in terms of location and time. Under 1991 conditions, gold placer mines could economically beneficiate gravels containing as little as 0.49 grams per cubic meter (0.01 oz/cubic yard). However, average recoverable gold content of precious metals from placer gravels was 0.82 gm/m³ (0.02 oz/yd³) of material washed. (U.S. DOI, Bureau of Mines 1992a).

Regardless of size, most placer mines throughout the country operate on a seasonal basis (ADEC 1986; U.S. EPA 1988a). The small size of most placer operations and the relative ease in establishing an operation make placer mines particularly sensitive to fluctuations in market prices; more mines are active when prices are up and fewer are active as prices drop. These facts contribute to the difficulty in establishing the number of mines operating at any one point in time (U.S. EPA 1988a). Additionally, the limited information collected by state and federal agencies, and the sources that these agencies use to determine the number of operational mines, make specific characterization of the placer mining industry exceedingly difficult.

This analysis does not address the economic consequences of mineral removal because the rights to the mineral estate are granted under the General Mining Act of May 10, 1872, as amended. Mining activities would occur under each alternative. Therefore, this economic analysis does not consider the value of mineral removal.

Within the Granite Creek Watershed analysis area, there are no currently approved mining Plans of Operations. There may be some small-scale operations that are limited to the use of hand tools. Small-scale operations that do not use mechanized earthmoving equipment are allowed by regulations and do not require the miner to contact the Forest Service. The contribution to the local economy of these operations cannot be measured and will not be included in this analysis.

The operations considered in this analysis typically do not employ workers so labor cost is not included in the operating cost.

Employment and Income

Employment within Baker and Grant Counties is distributed in industry sectors as displayed below in Table 3-62. Government and Retail Trade are the largest components of employment in the counties. Mining employment represents 2% in Baker County and 1% in Grant County. The largest employer for mining in Baker County is Ash Grove cement plant at Durkee which has 109 employees.

Table 3-62: Employees and Wages by Industry¹⁴

Industry	Baker		Grant	
	Employment	Avg. Salary	Employment	Avg. Salary
Accommodation and food services	694	\$16,677	216	\$14,634
Administrative and waste services	234	\$14,427	108	\$14,528
Arts, entertainment, and recreation	99	\$3,818	55	\$3,000
Construction	508	\$20,428	0	0
Finance and insurance	245	\$28,098	107	\$25,701
Forestry, fishing, related activities, and other	185	\$13,324	245	\$29,755
Government	1,264	\$52,303	1033	\$53,073
Information	113	\$28,788	53	\$39,208
Management of companies and enterprises	50	\$12,320	0	0
Manufacturing	704	\$39,132	0	0
Mining	134	\$16,097	18	\$4,556
Other Services, except public administration	589	\$27,168	207	\$22,889
Professional and	370	\$24,046	114	\$21,307

¹⁴ www.zoomprospector.com

Industry	Baker		Grant	
	Employment	Avg. Salary	Employment	Avg. Salary
technical services				
Real estate, rental, and leasing	390	\$7,664	0	0
Retail trade	1,075	\$22,022	420	\$20,421
Transportation and warehousing	291	\$46,069	0	0
Utilities	87	\$82,655	0	
Wholesale trade	122	\$27,672	58	\$24,207

Figure 3: Oregon Mining Industry Fact Sheet

MINING IN OREGON

Oregon's mining industry is vital to the state's economy. It ranked thirty-fifth nationally in total nonfuel mineral production value in 2004. The value of nonfuel minerals was \$367 million. The industry employed 2,866 workers with an average annual income of \$40,898. Oregon's combined direct and indirect economic output gain from the mining industry was \$1.4 billion (2005 data).

America's mining industry directly employed over 320,000 employees in 2004, who labored to produce minerals with a total value of over \$67 billion. These materials were further transformed by consuming industries into consumer and industrial goods creating an additional \$2.0 trillion in value added by other mineral, metal and coal consuming industries.

FACTS ABOUT OREGON'S MINING INDUSTRY

Oregon produces about 1% of the total U.S. nonfuel mineral value. Construction sand and gravel and crushed stone were the state's leading nonfuel minerals.

Employment 1/		Annual Production Value	
Total State Industry	2,866	Clays	W
		Gemstones	1,210,000
Number of Mines		Sand and gravel:	
Nonfuel Minerals	268	Construction	125,000,000
		Stone:	
Annual Wages		Crushed	126,000,000
Mining Industry Average 2/	\$40,898	Others*	114,000,000
Total State Average		Total	\$367,000,000
(Private Sector)	\$36,826		
Coal Consumption (short tons)		Mining's Impact on Oregon's Economy 3/ (millions)	
Electric Power	2,077,000	Output Generated - Direct	\$400
Industrial	W	Output Generated - Indirect	1,000
Residential/Commercial	W	Total	1,400
Total	2,141,000	Earnings Generated - Direct	148
Value of Nonfuel Mineral		Earnings Generated - Indirect	286
Production Per Capita	\$101	Total	434
Per capita nonfuel mineral value reflects the amount of nonfuel minerals produced per person in the state. The value is calculated by dividing the total value of nonfuel mineral production by the total state population. (2004 U.S. Census Bureau data).		Personal Income and Tax Revenue Generated	156
		Employment Impacts	
		Employment Generated - Direct	3,100
		Employment Generated - Indirect	8,900
		Total	12,000

Note: Data may not add to totals because of independent rounding.

1/ Includes employees of all mining sectors, contractors and office workers.

2/ Includes coal.

3/ Data provided by the Moore Economics study, *The Economic Contributions of the Mining Industry in 2006* (2005 data).

W Withheld to avoid disclosing company proprietary data.

* Combined values of cement (portland), clays (bentonite), diatomite, emery (2002 - 03), lime, perlite (crude), pumice and pumicite, and talc (crude).

Sources: U.S. Geological Survey, Mineral Industry Surveys, 2004; DOE/EIA Coal Industry Annual 2004; Bureau of Labor Statistics, Average Annual Pay Report 2004 and Mine Safety & Health Administration 2004 Part 50 data.

National Mining Association 101 Constitution Ave., NW Suite 500 East, Washington, DC 20001 202/463-2600

Note: Sand, Gravel, and Crushed Stone are the States leading non-fuel minerals.

Environmental Justice

Executive Order 12898 requires Federal agencies to “identify and address the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” According to the Council on Environmental Quality’s (CEQ) Environmental Justice Guidelines for NEPA (1997) “minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.....a minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above stated thresholds.” Thus, the ethnic and racial composition of Baker and Grant County, surrounding the potential mining activity are of interest. The shares of population by race and ethnicity are displayed in Table 3-63¹⁵ below. In 2012, the share of population described as white was greater than the state in both Counties. Since the difference in shares between the different counties is small, these differences are not considered “meaningful” as defined by the CEQ. Thus, while minority groups exist in the area, they are not considered environmental justice populations.

Table 3-63: Population by Race and Ethnicity

Category	Baker County		Grant County		Oregon
Population, 2012 estimate	15,909		7,317		3,899,353
Population, 2010 (April 1) estimates base	16,134		7,445		3,831,073
Population, percent change, April 1, 2010 to July 1, 2012	-1.4%		-1.70%		1.8%
Population, 2010	16,134		7,445		3,831,074
White persons, percent, 2011 (a)	95.5%		95.50%		88.6%
Black persons, percent, 2011 (a)	0.4%		0.30%		2.0%
American Indian and Alaska Native persons, percent, 2011 (a)	1.2%		1.30%		1.8%
Asian persons, percent, 2011 (a)	0.5%		0.40%		3.9%
Native Hawaiian and Other Pacific Islander persons, percent, 2011 (a)	0.1%		0.10%		0.4%
Persons reporting two or more races, percent, 2011	2.4%		2.40%		3.4%
Persons of Hispanic or Latino Origin, percent, 2011 (b)	3.6%		3.10%		12.0%
White persons not Hispanic, percent, 2011	92.2%		93.00%		78.1%

¹⁵ <http://quickfacts.census.gov>

Civil Rights, Women, and Minorities

Adverse effects on civil rights, women and minorities not already identified in the FEIS for the WWNF and UNF forest plans are not expected from implementing the alternatives. To the greatest extent possible, all populations have been provided the opportunity to comment before decisions are rendered on proposals and activities affecting human health or the environment. The proposals within this EIS would not have a direct or indirect negative effect on minority or low-income populations.

Environmental Effects

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

All National Forest System lands within the analysis area are open to mineral entry. US citizens have a statutory right to remove valuable minerals from National Forest System lands open to mineral entry. Therefore, mining activities would occur under all the alternatives, including the No-Action Alternative. However, the 28 proposed Plans of Operations would not be authorized for approval under this alternative.

The regulations governing the surface use of National Forest System lands allow a level of operations to occur without authorization from the Forest Service. Each specific site is evaluated to determine what level of activity may occur under the regulations. This evaluation is first conducted by the miner. However, the level of operations allowed under the regulations cannot cross the threshold of causing a significant disturbance.

Assuming that the level of operations under this alternative is low impact and typically small, there is no way to measure what level of economic contribution would occur.

There would be no direct effects on the socioeconomic environment if no action were to take place. Any change in conditions would occur as a natural progression of economic and social activity, thus there is no means of estimating the indirect effects of taking no action.

Cumulative Effects of No Action

Given that there are no measurable direct and indirect effects that would occur under the no action alternative, there would also be no measurable cumulative effects.

Alternatives 2 and 3 – Proposed Action and Proposed Action with Forest Service Requirements

Direct and Indirect Effects of Proposed Mining Activities

Alternative 2 and 3 have the same estimated effects on the cost to mine one half acre of land.

Although in Alternative 3 proposes implementation of site-specific mitigations and the General Requirements, this would not measurably change the economic benefit or harm. A majority of these requirements adjust operating practices to reduce the environmental effects. Examples of these requirements include maintaining disturbed sites in a stable condition, armoring fords, placing lined vaults under hazardous materials, using certified weed-free straw, and maintaining erosion control devices on roads. These are all considered best management practices and do not represent a substantial investment of time or money. Other requirements would have a direct cost associated with them, such as the purchase of fire tools, hazardous spill kits, and in some operations, water testing. These requirements would not represent a substantial investment by the miners.

Another factor that may increase cost equally under both alternatives is the requirement to comply with all Federal and State laws and regulations. In Alternative 2, the individual mining proposals may not have included this requirement. However, Alternative 3 specifically addresses compliance with all laws (G18). A decision to select any of the alternatives would not affect this requirement.

Based on the BLM spreadsheet (attached), the cost to operate is estimated at \$17,800 per half acre mined. This cost is associated with supplies, materials, and the cost to operate equipment (fuel, repairs, supplies, and maintenance). All these expenses would contribute to the local economy. The cost benefit to the miner would be the value of gold recovered minus the operating cost.

Implementation of either Alternative 2 or Alternative 3 would have a positive effect on the local economy. Even if only a percentage of mines are operational in a given year, for each half acre mined, \$17,800 in operational cost would benefit the local community.

Cumulative Effects of Proposed Mining Activities

Cumulative Effects Analysis

Long-term timeframe: 10 years because economic change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this timeframe speculative.

Spatial Boundary: Analysis area: Granite Watershed

The cumulative effects of either alternative include the change in social and economic conditions that would result from the operation of these mines, in conjunction with the direct and indirect effects of other present and reasonably foreseeable activities being conducted in the Granite Watershed. It assumed that the effects from past activities have already been absorbed by local communities and are represented in the affected environment. Any change in the social and economic environment as a result of these alternatives would be in addition to other mining activities (hand work), and any other income producing activities occurring simultaneously in the analysis area, as well as those that could reasonably occur in the future.

Within the analysis area there is a very limited economic base to benefit the local economy. There are no current mines operating in the area. The Buffalo mine, located on private land within the watershed, has shown some recent interest from prospective investors, but no operations have occurred in several years. The City of Granite is located within the watershed but has only a small store/restaurant/gas station and limited lodging. An increase in mining activity would most likely benefit these local businesses, however, most materials, supplies, services and equipment would come from Baker City, the largest community near the analysis area with a full range of services. As stated above, the benefits of business within the analysis area have already been absorbed into the local economy. Therefore, the proposed mining activities would have an immeasurable positive cumulative effect on the local economy (City of Granite), and may have a small positive effect on the community of Baker City.

This page intentionally left blank.

Cultural Resources

Introduction

This Cultural Resources analysis incorporates by reference and summarizes what is found in the two Cultural Resources specialist reports from the WWNF and UNF (project file-FOIA exempt).

For all proposed Plans on both forests, approximately 104 acres are planned for actual work activities. The smallest mine work area is 1 acre, and the largest is 10 acres. The Area of Potential Effect (APE) is being defined as the proposed work area within the claim boundary.

Prehistoric and historic sites (primarily historic mining sites) are documented in the Granite Mining analysis area. Structures, both historic and modern, are present in the mining project area. In most cases, the structures belong to the miners as part of their mining operations. There are also several prehistoric sites recorded in the mining project area. These prehistoric sites will be avoided by all mining activities.

Prehistoric/Historic Setting

Prehistoric and historic American Indian cultural resource site types may include lithic scatters (chipped stone artifacts), resource utilization areas such as tool stone quarries and plant processing sites, seasonal camps such as small habitation areas or large villages, and special places. Special places may consist of sites and places that are valued for cultural, religious, or traditional importance (for example, traditional food locations such as berry areas, root gathering areas, medicinal plant grounds, and collection areas for materials for utilitarian and ceremonial craft production, as well as usual and customary hunting and fishing locations). Artifacts may include obsidian, chert, or basalt projectile points, knives, scrapers, burins, bifaces, utilized flakes, and debitage. Bone tools, stone cobble tools, mortars and pestles, net sinkers, beads, and various metal objects may also be included in artifact assemblages.

Prehistoric residents of the Plateau region of the interior northwest adapted to the harvest and long-term storage of several key resources. The key resources included fish, edible plants, and a wide variety of animals. All three forms of sustenance played heavily in the survival of Plateau peoples.

Historic cultural resources include remains and records of the past that are at least 50 years old. Cultural materials or locations show occupation and resource utilization of the Plateau region of the interior northwest. Sites may include trash dumps, log cabins, building complexes, mines, ditches, and railroads, and are most often related to homesteading, timber harvest, or mining activities. Also represented are administrative sites related to early Forest Service management. Artifacts may include notched logs or cut lumber, tin cans, bottles and jars, ceramics, and metal items such as tools.

Historic mining sites may include mining adits and pits, tailings, structures such as cabins and stamp mills, trash dumps, and water ditches. Artifacts may include large equipment such as boilers and trommels, and smaller items such as hand tools, tin cans, bottles, and jars.

With regard to tailings, most of the proposed Plans are in locations with some form of historic mining and resulting tailings. The current projects may move historic tailings about as the tailings

are re-processed. However, in many areas this activity has happened a number of times. The re-processing and moving about of tailings in the Granite Creek watershed has been ongoing over time and can be considered a continuation of historic activity rather than a new or different activity.

Culturally Significant Foods

According to the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), First Foods are those resources, reserved in their treaty, to which Tribal members retained rights. These rights, such as hunting, fishing, and gathering roots and berries, have been acknowledged by the United States Supreme Court. The CTUIR's mission to protect, restore, and enhance the First Foods (including water, salmon, deer, cou, and huckleberry) for the perpetual cultural, economic, and sovereign benefit of the Tribe measures the success of resource management by the availability and utilization of these resources. The sustainability of these resources is considered by them the minimum ecological condition necessary to meet the subsistence needs of the community. In addition to first foods, there are other foods, medicines, materials and plants that are expected to occur in association with first foods when landscapes are in high quality, high functioning physical and ecological condition.

At least three known subsistence areas utilized by the Cayuse and Umatilla are in or near the analysis area. Culturally significant foods (both flora and fauna) are being addressed in other sections of the EIS.

The botany specialist report includes an evaluation of the presence of some of the culturally significant plants on the proposed mining claim sites. Although not all culturally significant plants were surveyed for or were addressed, the Forest Service conducted a botanical survey of the mining claims to identify known culturally significant plants. The result of this survey is documented in a separate botanical report. The Wildlife section of this chapter addresses impacts to big game, and the Fisheries section addresses fish species and habitat. Big game includes elk and deer, and efforts were made to identify any habitat issues that might impact these populations. Fish resources were also addressed from the habitat perspective, mainly for potential water quality issues. For further information on these resources please, refer to these respective sections of this chapter.

Traditional Cultural Properties (TCPs)

The National Register Bulletin: Guidelines for Evaluating and Documenting Traditional Cultural Properties states “to determine what constitutes a reasonable effort to identify traditional cultural properties is to consult those who may ascribe cultural significance to locations within the study area.” Consultation with interested parties, including Tribal Historic Preservation Offices and elected Tribal government officials, is initiated through the Section 106 process of the NHPA and through the National Environmental Policy Act. If traditional cultural properties are identified through the Section 106 or NEPA scoping process, they will be evaluated through consultation with the THPO and SHPO offices. The National Forests depend on Tribal feedback in order to identify potential traditional cultural properties.

Maps showing the analysis area, and a brief description of the project, were provided to the CTUIR during the following National Forests-CTUIR Program of Work meetings:

Natural Resources Committee and staff; February 22, 2012
Fish & Wildlife and Cultural Resources Committees and staffs; March 27, 2012
Board of Trustees government-to-government; May 9, 2012
Natural Resources Committee and staff; May 20, 2013
Fish & Wildlife and Cultural Resources Committees and staffs; June 25, 2013
Board of Trustees government-to-government; August 23, 2013
Natural Resources Committee and staff; June 4, 2014
Fish & Wildlife and Cultural Resources Committees and staffs; July 15, 2014
Board of Trustees government-to-government; September 19, 2014

CTUIR concerns were expressed regarding water, fish, and cultural resources.

Maps showing the analysis area, and a brief description of the project, were provided to the Nez Perce Tribe at staff-to-staff Program of Work meetings on April 24, 2012, and April 4, 2013. No tribal concerns were expressed about the project.

Maps showing the analysis area, and a brief description of the project, were provided to the Confederated Tribes of Warm Springs at a meeting on October 30, 2013.

Drafts of cultural resource specialist reports from the WWNF and UNF were submitted to the CTUIR and Confederated Tribes of Warm Springs on July 11, 2014. A final WWNF cultural resource specialist report was submitted to the CTUIR, Confederated Tribes of Warm Springs, and Nez Perce Tribe on August 17, 2014. An updated UNF cultural resource specialist report was submitted to the CTUIR and Confederated Tribes of Warm Springs in August, 2014. A preliminary Granite Creek Watershed Mining DEIS was submitted to the CTUIR and Confederated Tribes of Warm Springs in September of 2014. A meeting was held with both Forests and CTUIR staff on November 17, 2014 to review comments on the preliminary DEIS and cultural resource specialist reports. Tribal comments were addressed and, as appropriate, incorporated in this DEIS.

Laws, Regulations and Policy

In 1966 Congress declared that the federal government "administer federally owned, administered, or controlled prehistoric and historic resources in a spirit of stewardship for the inspiration and benefit of present and future generations" (National Historic Preservation Act (NHPA)) (16 U.S.C. 470-2(3)). This need was made more explicit when the NHPA was amended in 1980 and Section 110 was added to expand and underscore federal agency responsibility for identifying and protecting historic properties and avoiding unnecessary damage to them. Many historic properties are fragile, and once damaged or destroyed they cannot be repaired or replaced.

Section 106 of the NHPA compels federal agencies to take into account the effect of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (36 CFR 60).

Cultural resources provide information on the Wallowa-Whitman and Umatilla National Forests' prehistoric and historic heritage, including evidence of several American Indian groups (primarily the Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs

Indian Reservation, and the Nez Perce Tribe and their predecessors), and other groups such as European-Americans and Chinese. In addition to providing archaeological evidence of past lifeways and adaptation to the environment, cultural resources also lend a historic perspective on today's technological and sociological change.

The Forest Service is directed to identify, evaluate, treat, protect, and manage historic properties by several laws. However, the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.), provides comprehensive direction to federal agencies about their historic preservation responsibilities. Executive Order 11593, Protection and Enhancement of the Cultural Environment, issued in 1971, also includes direction about the identification and consideration of historic properties in federal land management decisions. It directs federal agencies to inventory cultural resources under their jurisdiction, to nominate to the National Register of Historic Places federally owned properties that meet the criteria, to use due caution until the inventory and nomination processes are completed, and to ensure that federal plans and programs contribute to preservation and enhancement of non-federally owned properties.

The NHPA extends the policy of the Historic Sites Act of 1935 (49 Stat. 666; 16 U.S.C. 461-467) to include resources that are of state and local significance, expands the National Register of Historic Places (NRHP), and establishes the Advisory Council on Historic Preservation (ACHP) and State Historic Preservation Officers (SHPOs). NHPA Section 106 directs all federal agencies to take into account effects of their undertakings on properties included in or eligible for the National Register. Regulations 36 CFR 800 implement NHPA Section 106. Section 110 sets inventory, nomination, protection, and preservation responsibilities for federally-owned historic properties.

The Forest Service Manual, Chapter 2360, Cultural Resource Program Management, provides guidance for the National Forests. Guidance is also provided by the 2004 Programmatic Agreement among the USDA Forest Service PNW Region 6, the ACHP, and the Oregon SHPO Regarding Cultural Resources Management in the State of Oregon by the USDA Forest Service.

Survey Methodology and Results

With the exception of Old Eric 1 and 2, which had no previous cultural survey recorded, all the claim areas had previous survey associated with them and each claim area was revisited by an archaeologist as part of this project. In addition, the area associated with Old Eric 1 and 2 was surveyed as part of this project. The purpose of these visits was to examine the area of potential effect (APE) for each location and to note any changes that might have occurred since the area was previously visited. The APE for each Proposed Plan of Operation is the proposed work area within the claim boundary. Road accesses to claims from main Forest Service roads were included in this assessment and potential impacts were also considered.

It is recognized that most if not all of the proposed mining claims are either in whole or in part occurring on old dredge or other mining tailing. These older tailing being associated with previous mining entries into these areas have some historic value, however the historic value of the tailing is in their existence at these locations as mining remains, rather than in the tailings themselves. Given this, these claims tend to fall in the realm of “living history”. Therefore, they are being considered a continuation of the historic activity that created them, albeit at a much smaller scale, rather than a completely new or different activity in the area. There is the potential to move these tailing around because the miners are intending to, in some plans, reprocess these tailings. In many cases, these

tailings have been processed and moved at least once if not twice before. It is believed that given the small amounts of material (relative to what is there), that this moving around of the tailings would not significantly impact or destroy any cultural value associated with these tailings.

WWNF

Surveys were conducted in 2008, 2013 and 2014 for this project. Some areas were completely open ground exposed by mining or road activity, and others were forested with some duff cover and vegetation. Survey conditions were generally good, and weather was clear and dry.

The entire analysis area has received intensive inventory, through a combination of past and current survey.

The majority of the project area had received previous adequate survey; however, current survey was completed in most proposed work areas by Nolan and Purvis. Their transect interval was 20 meters or less, and transects generally followed the contours of the terrain. Harvey completed a current reconnaissance survey of all project areas. He also completed intensive survey, at 20 meter or less transects, for those work areas which were not covered by Nolan and Purvis. For roads that received current survey, a corridor width of at least 40 meters (20 meters on either side of centerline) was accomplished. During surveys, special attention was given to areas of high visibility such as bare ground, rodent mounds, road or stream cuts, and natural and human-caused disturbance.

Total survey acres was 467 (445 project acres, plus 22 extra acres). Nolan and Purvis's current intensive survey was approximately 165 acres; they focused on proposed work areas and in a few places surveyed beyond the actual project boundary. Harvey's current survey included approximately 56 acres of intensive, with the remaining 389 of the project acres receiving reconnaissance survey. (Note that the Nolan and Purvis survey area and the Harvey survey area have some overlap.)

Cultural resource sites that were monitored were documented. Photos were taken. Sketch maps were updated. Transect interval in the site areas was less than 20 meters.

All project areas were surveyed. Eighteen previously recorded cultural resource sites were monitored. The sites include mines, tailing and adit locations, ditches, historic artifact scatters, and a small bridge. Eleven of the sites are not eligible for the NRHP, five are unevaluated, and two are eligible. No new sites were located.

UNF

Survey results from previous UNF projects were used for this analysis. In addition, each of the proposed mine locations were visited and surveyed by an archaeologist. Old Eric 1 and 2 were surveyed as part of the project and the results are documented in the cultural report.

The data gathered consisted of collecting GPS locations for all of the buildings (if there are any associated with the claim), taking photographs of the buildings, and surveying the areas for potential prehistoric archaeological material.

In addition, additional research was conducted at the county court house of Grant County in John Day Oregon as well researching any historical information available in Granite and Ukiah.

The claims intersect 22 sites and 1 isolated find, and an additional 13 sites and 2 isolated finds are within 100 meters of the claim boundaries. Of the sites that intersect the claims, 21 are historic, one is pre-historic, and the isolated find is historic. Of the 13 sites and 2 isolated finds that are outside the claim boundaries (do not intersect the claims), all are historic. The single pre-historic site is a lithic scatter that is considered eligible for listing on the National Register of Historic Places (NRHP). The 3 isolated finds are considered not-eligible for listing on the NRHP by definition.

The sites that are unevaluated for NRHP eligibility (all are historic mining-related sites) will be treated as eligible and protected as needed from project activities. There are some notable exceptions to this strategy. Some of the cabins that are unevaluated are the property of the miners so the ability of the Forest Service to protect these cabins is limited to stipulations in the permits; this, however, is deemed adequate protection since the permit holders are obligated to follow the terms of their permits. The Forest Service will work cooperatively with the miner to protect these cabins.

Requirements and Protection Measures

General Requirements

With regard to historic structures on mines, there may be opposing interests between the Forest Service and miners. By law, within a claim, the claimant has the right of exclusive possession to appurtenances such as cabins, although the use must be directly related and incident to the mining operations actually conducted on the claim. In the past, if a miner wanted to remove or modify a structure, the Forest Service perceived that it had very limited options. For this project, the Forest Service has made an effort to work cooperatively with miners to discuss historic structures and recommended protection efforts.

Historic mine features such as tailings, adits, and pits may also be features of opposing interests between Forest Service cultural resource specialists and miners. Within a claim boundary, the claimant has the exclusive right to explore, develop, and mine the minerals. In the past, great leniency was given to miners with regard to historic features; and this can be seen in most of the current project areas, where many historic adits and tailings have also been worked in modern times.

For the current project, there are some general requirements that must be followed as part of the mining Plans of Operation and permits. The following three requirements pertain to cultural resources:

G3. Operations shall be conducted to prevent damage to historic properties or objects of antiquity protected by American Antiquities Act (16 U.S.C. 433); Section 106 of the National Historic Preservation Act of 1966, as amended; National Environmental Policy Act of 1969; American Indian Religious Freedom Act of 1978; Archaeological Resource Protection Act of 1979, as applicable in 36 CFR 261 Regulations; applicable Sections 36 CFR 800 Regulations; and other laws and various executive orders that protect cultural resources. Miner shall stop all operations and notify the Forest Service of any discovery of cultural or natural history resources and work will not continue in the area of the discovery until the properties have been evaluated and all necessary consultations are complete. Removal or destruction of historic artifacts is a violation of Federal law and as such not allowed.

Historic building that are eligible for listing or are unevaluated will be maintained as eligible by following the Secretary of Interior's Guidelines for Historic Preservation and consulting with the Forest Service.

G17. If unexpected cultural resources are encountered during project implementation, these resources will be protected from disturbance and evaluated for eligibility for inclusion on the National Register of Historic Places. Significant resources will be avoided or mitigated as described below. In accordance with 36 CFR 800 and Section 106 of the National Historic Preservation Act (1966), all unevaluated sites will be avoided pending determination of eligibility for listing on the National Register of Historic Places by the Forest Service and consultation with the Oregon State Historic Preservation Office, affected tribes and other consulting parties. All eligible and unevaluated sites will be protected throughout the life of the project as required by law. Protection of these sites, in most cases, shall be accomplished through avoidance by ground-disturbing activities.

If protection or avoidance of significant cultural resources is not possible, mitigation measures will be developed in consultation with the Forest Service and the Oregon State Historic Preservation Office, affected tribes, other consulting parties, and in some cases the Advisory Council on Historic Preservation.

G18. Approval of this plan does not relieve the miner from complying with all applicable Federal, State, or County laws or regulations. Any regulations/laws referenced herein are for emphases only and not intended to cover all regulations that may apply to this operation.

Site-specific Cultural Resource Protection Measures

As a result of the field surveys, recommendations were made to protect or avoid specific cultural sites. These protection measures are identified by Plan in Alternative 3, Chapter 2 of this EIS.

Environmental Effects

Alternative 2 – Direct/Indirect and Cumulative Effects

Alternative 2 does not include the site-specific cultural resource protection measures or General Requirements to avoid and/or protect cultural resource sites within the Area of Potential Effect (APE) of several proposed Plans. Therefore, Alternative 2 has the potential for ground-disturbing or other impacts to known and unknown cultural resource sites from the proposed mining-related activities.

Alternative 3 – Direct/Indirect and Cumulative Effects

Although there are cultural resource sites located within the Area of Potential Effect (APE) of several proposed Plans, the site-specific cultural resource protection measures identified in Chapter 2 and General Requirements G3, G17 and G18 are sufficient to protect all eligible and unevaluated sites, and as such the proposed Plans should not have an adverse effect (no direct/indirect or cumulative effects) on any historic properties present. Therefore it has been determined that there will be “**No Adverse Effect**” to any known eligible or unevaluated cultural resources from the proposed mining-related activities.

In the event that a previously unknown cultural resource is encountered, it will be protected from disturbance and a forest archaeologist will be notified. Work will not continue in the vicinity of the newly discovered resource until it has been evaluated for the NRHP and all necessary consultations completed.

Other Required Disclosures_____

Unavoidable Adverse Effects

Localized sediment inputs/reduced water quality at site and down stream

Off-channel activity that would have a water quality impact is limited to the 1) mining activity at Belvadear and 2) mining activity at Blue Sky Bull Run (Blue Sky site 3). The impacts are summarized below and discussed in detail in Appendix 7 by Plan.

The mining activity at Belvadear would input sediment via subsurface flow of sediment generated by mining in the riparian area into Olive Creek through the narrow berm which separates the area to be mined and Olive Creek. The berm is composed of old placer tailings and flow was observed entering the creek through the berm at two points indicating connection between the creek and the proposed mining area.

The mining activity at Blue Sky Bull Run (site 3) has the potential for a discharge of sediment into Bull Run Creek as a result of active mining in the side channel.

Localized increases in stream temperatures and reduction in stream flow at the sites

Eight Plans proposed to withdraw water from creeks within the Granite watershed. Of the eight, five Plans have the potential to withdraw enough water to measurably increase localized stream temperatures and reduce stream flow. They are Belvadear, Lightning, Olive Tone, Tetra Alpha Placer and Tetra Alpha Mill and Lode. The impacts are summarized below and discussed in detail in Appendix 7 by Plan.

Under these five Plans, water withdrawals would occur on Boulder Creek (Tetra Alpha Placer and Tetra Alpha Mill and Lode), Lightning Creek (Lightning Placer) and Olive Creek (Belvadear and Olive Tone). These three streams are small tributaries and available data show that currently stream depths and flows are low in the summer and stream temperatures exceed the ODEQ standard. Therefore, the miner's proposal to withdraw water during the summer has the potential to 1) increase stream temperatures downstream, 2) decrease water depths downstream, and/or 3) dry up the stream below the operation. The magnitude of the impact would vary as a function of climate and flow conditions that year and prior years.

Localized increases in detrimental soil conditions and loss of soil productivity

Soils would be disturbed and soil productivity lost as a result of the proposed activities. The mining areas proposed for activity are small (< 10 acres) and in many cases a portion of the activity area has already been disturbed due to past mining activity. Therefore, the amount of new detrimental soil disturbance would be small when assessed at the subwatershed scale (**Table 3-24**). The addition of Forest Service General Requirements would help accelerate the recovery of soil productivity and prevent soil erosion (Appendix 2), though the length of time required to restore soil structure and soil productivity once it has been lost could still be on the order of decades.

Short-Term Use and Long-Term Productivity

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

The majority of uses under the Plans of operations continue mining activity on the same areas that have been disrupted for over a century. Mining is not a short-term use. It may take decades to exhaust a mineral source. During that time, activity varies with the market for the mineral being mined.

Long-term productivity at the sites has been changed. Under Alternative 3, additional protection measures and requirements have provided for future forest productivity on freshly disturbed sites by preserving topsoil, establishing vegetation in kind, and otherwise reclaiming sites. However, historic disturbance that is not a part of the current Plans of Operations will remain in a state of low productivity until restoration occurs and assists in the process of recovery.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

Loss of cultural sites resulting from accidental damage or vandalism would be an irreversible commitment of resources. Extensive cultural resource surveys and a requirement to avoid and protect cultural sites provide reasonable assurance that there would be no irreversible loss of cultural resources.

Minerals are a limited resource. They were generated through geologic activity. There is little chance that more minerals will be created in this geologic era. Removal of the mineral is irreversible. There may be other as-yet undiscovered sources that would counteract this extraction, but since the area has been mined for over a century, it is likely that most sources have already been located and are in the process of being removed at various rates. Until such time as all the mining activity has been completed within the Granite Creek Watershed, the sites are irretrievably committed to mining.

There are no known significant irreversible resource commitments or irretrievable losses of timber production, wildlife habitats, fisheries, or water quality from actions initiated under any of the alternatives. Water quality and soil impacts are addressed above under the heading “Unavoidable Adverse Effects”.

Plans and Policies of Other Jurisdictions

State, County and other Required Permits

Other authorities may require additional permits for some or all of the activities included in a proposed Plan of Operations. It is the responsibility of the miner to make sure they obtain all required state, county or federal permits necessary to conduct their mining operation. These permits are generally enforced by the agency which issues and administers the permit. The Forest Service has consulted with several of these agencies during this analysis process and will provide copies of this document to those agencies as requested (Appendix 2, General Requirements G18 and G19). Approval of a Plan of Operation by the Forest Service does not remove the legal liability of the miner to abide by other state and federal laws or regulations.

The following Oregon Department of Environmental Quality (ODEQ) and Oregon Department of State Lands (DSL) permits are specifically mentioned in this document in conjunction with some of the proposed activities. One or more of the following permits may be required.

- **The 700-PM Permit**
- **General Permit (600 permit)**
- **Individual Permit** – required if operation does not fit General Permit
- **401 certification** – if an operation... “may result in any discharge into the navigable waters”,... “the mining operator must give a copy of this 401 certification to the Forest Service prior to the Agency approving the Plan of Operations” (FSM 2817.23a(1) - Compliance With the Clean Water Act)

Clean Air Act

This project will have no impact on air quality. There are no fuel treatments planned, so there will be no smoke emissions from the burning of fuels. Mining activity could create a limited amount of dust, but this would be confined to the project area and would not affect any areas designated for protection under the State of Oregon’s Smoke Management Program.

Clean Water Act (CWA)

Refer to the Water and Soil Resources analysis in this chapter for a description of how the alternatives comply with the CWA.

Wetlands and Floodplains

Refer to the Water and Soil Resources analysis in this chapter for a description of how the alternatives comply with Executive Orders 11988 and 11990.

Public Health and Safety

All action alternatives include provisions to protect the general public from the hazards of mining operations.

Mining operations can pose a safety risk to the general public. Uninformed recreationists may inadvertently travel onto active mining sites. Trucks and other vehicles used in the mining operation may pose a hazard to recreationists using the same roads. Pits and unguarded adits also pose a risk. The Code of Federal Regulation for Parks, Forests, and Public Property at 36 CFR 228.9 (maintenance during operations, public safety) states that during all operations, the operator shall maintain structures, equipment and other facilities in a safe, neat and workmanlike manner. Hazardous sites or conditions resulting from operations shall be marked by signs, fenced, or otherwise identified to protect the public in accordance with Federal and State laws and regulations. Because all authorized Plans would be required to adhere to all mining-related laws, regulations and policies, all action alternatives include provisions to protect the general public from the hazards of mining operations. Additional management requirements to protect the general public have been incorporated in the Plans of Operations included under Alternative 3 (Appendix 2 – General Requirements).

Effects on ESA-Listed Species and Regional Forester's Sensitive Species

The Endangered Species Act requires protection of all species listed as “Threatened” or “Endangered” by Federal regulating agencies (U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration – Fisheries). The Forest Service maintains through the Federal Register a list of species which are proposed for classification and official listing under the Endangered Species Act, species which appear on an official State list, or that are recognized by the Regional Forester as needing special management to prevent being placed on Federal or state lists. This section identifies the actions taken to comply with the Endangered Species Act. Details regarding the actual species found within the analysis area and the potential effects of proposed activities on the species and their habitat are contained under Wildlife, Fisheries, and Botany sections of this chapter.

Plants

There are no known populations of “Threatened” or “Endangered” plant species within the analysis area. A biological evaluation has been completed for “sensitive” plant species. See the Botany section of this chapter for more detailed discussion of the predicted effects on “Sensitive” plant species.

Terrestrial Wildlife

Effects of the proposed activities are not considered significant in the context of the analysis area, the Wallowa-Whitman National Forest, the Umatilla National Forest, and the Blue

Mountains. Wildlife species and habitat will not be significantly impacted by activities that are limited in duration and intensity and affect a relatively small area. No adverse effects are expected for any wildlife species listed as “Sensitive” by the Forest Service, nor those listed as “Threatened” or “Endangered” by the U.S. Fish and Wildlife Service. A determination has been made that the proposed activities would have no effect to threatened Canada lynx, therefore consultation with the U.S. Fish and Wildlife Service is not required for listed wildlife species. A biological evaluation has been completed for “sensitive” wildlife species. See the Wildlife section of this chapter for more detailed discussion of the predicted effects on “sensitive” wildlife species.

Aquatic Species

Threatened aquatic species within the analysis area are Middle Columbia River (MCR) summer steelhead, Columbia River bull trout and their designated critical habitat (DCH). Effects of the proposed activities to aquatic species are not considered significant in the context of the analysis area, the Wallowa-Whitman National Forest, the Umatilla National Forest and the Blue Mountains. Aquatic species and habitat will not be significantly impacted by activities that are limited in duration and intensity and affect a relatively small area. The biological evaluation for “sensitive” aquatic species has been incorporated into the Fisheries analysis in this chapter. A more detailed discussion on the effects of proposed activities is available in the Fisheries section of this chapter and the Biological Assessment in the project file.

Effects on Cultural Resources with SHPO Concurrence

If unexpected cultural resources are encountered during project implementation, these resources will be protected from disturbance and evaluated for eligibility for inclusion on the National Register of Historic Places. Significant resources will be avoided or mitigated as described below. In accordance with 36 CFR 800 and Section 106 of the National Historic Preservation Act (1966), all unevaluated sites will be avoided pending determination of eligibility for listing on the National Register of Historic Places by the Forest Service and consultation with the Oregon State Historic Preservation Office, affected tribes and other consulting parties. All eligible and unevaluated sites will be protected throughout the life of the project if possible. Protection of these sites, in most cases, shall be accomplished through avoidance by ground-disturbing activities or by following the Secretary of Interior’s Guidelines for Historic Preservation.

If protection or avoidance of significant cultural resources is not possible, mitigation measures will be developed in consultation with the Forest Service and the Oregon State Historic Preservation Office, affected tribes, other consulting parties, and in some cases the Advisory Council on Historic Preservation.

Consultation with Indian Tribes/Protection of Treaty Resources

Potentially affected Tribes were contacted during the analysis process (see Chapter 1, Public Involvement).

Certain rights and privileges were reserved by the Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation and the Nez Perce Tribe by virtue

of the treaties of 1855. These treaties resulted in cession by the Tribes to the United States of a large territory that includes the entire Umatilla National Forest and approximately two-thirds of what is now the Wallowa-Whitman National Forest. The treaties provide that the Tribes will continue to have the rights of taking fish in streams running through and bordering the reservations and at all other usual and accustomed stations in common with other citizens of the United States. Further, the tribes retain the right of erecting suitable or temporary buildings for fish curing as well as the privilege of hunting, gathering roots and berries, and pasturing stock on unclaimed lands. These rights remain unaffected, and were considered in the development of this document.

Chapter 4

Agencies and Persons Consulted

Recipients of the Draft Supplemental EIS

The following list contains the recipients of the Granite Mining Draft EIS. The list includes those who requested copies, responded to the scoping efforts, permittees affected by the proposal, and required agencies.

Agencies

Advisory Council on Historic Preservation
Department of Environmental Quality
Department of Land Conservation and Development
Department of Geology and Minerals Industries
Division of State Lands
Environmental Protection Agency, Region 10
FAA, Northwest Mountain Region
Federal Highway Administration
National Marine Fisheries Service, Habitat Conservationists Division
Natural Resources Conservation Service
NOAA Office of Policy and Strategic Planning
Northwest Power Planning Council
Oregon Department of Fish and Wildlife
Oregon Department of Forestry
Oregon Parks and Recreation Department
Oregon State Economist
Oregon State Water Resources Department
USDA APHIS PPD/EAD
USDA National Agricultural Library
USDA Office of Civil Rights
USDI Office of Environmental Policy and Compliance
U.S. Army Engineer, Northwest Division
U.S. Coast Guard
U.S. Department of Energy, Office of NEPA Policy and Compliance

Organizations

Hells Canyon Preservation Council
Oregon Wild

Individuals

Jan Alexander
Ken Anderson
Fadi Atiyeh
Norm Becker
James & Sandra Bisset
Randy Bunch
David Busselle
Brooke Myers
Brian Hanley
Roy Campbell
Charles Cree
Steve & Jonathan Cree
Mark Gates
Robert Glazebrook
Earl Graham
Scott & Rebecca Guthrie
Bill Holoboff
Alice Knapp
Dennis Koellermeier
Gene Ladoucer
Dianne Lewallen
Chad Marmolejo
Teneil McCreary
Melvin McDaniel
David & Janice Meheen
Norma & Brie Myers
Nate Nazer
Jeff Nazer
Tommy Partee
Anthony Perasso
Mark & Lori Roan
Sandy & George Row
Leslie Sissel
Steve Smith
Ray Woodward

Tribes

Confederated Tribes of the Umatilla Indian Reservation
Nez Perce Tribe
Confederated tribes of the Warm Springs Reservation
Burns Paiute Tribe

Preparers

The following agency personnel (past and present) participated in the preparation of the EIS. All personnel are current, previous or retired employees of the Wallowa-Whitman and Umatilla National Forests.

Jeff Tomac – Whitman District Ranger (WWNF)

Ian Reid – current North Fork John Day District Ranger (UNF)

Robert Varner – North Fork John Day District Ranger (UNF)

Suzanne Fouty – District Hydrologist (WWNF)

Edward Farren – South Zone Hydrologist (UNF)

Tracii Hickman – Threatened and Endangered Species Coordinator (UNF)

Allison Johnson – District Fisheries Biologist (UNF)

Chris Helberg – Minerals and Special Uses Administrator (UNF)

Mike Hall – District Minerals and Recreation Staff (retired WWNF)

Sophia Millar – Interdisciplinary Planner/NEPA (WWNF)

Jamie Ratliff – District Wildlife Biologist (WWNF)

Mark Darrach – Forest Botanist (UNF)

Josh White – Invasive Species Specialist (WWNF)

Bradley Lathrop - Invasive Species Specialist (UNF)

Allen Madril – Forest Archaeologist (UNF)

Sarah Crump – Forest Archaeologist (WWNF)

Erik Harvey – South Zone Archaeologist (WWNF)

Lori Seitz – South Zone Road Manager (UNF)

Eric Dreher – GIS Specialist

This page intentionally left blank.

Index

- 303(d) listed streams, 25, 84
- Access, 15, 19, 58, 233, 239, 240, 244, 245, 246, 247, 248, 288, 289
- Altona, 13, 32, 36, 52
- Belvadear, 13, 32, 36, 52, 64
- Blue Sky/Bullrun, 13
- Blue Smoke, 13, 32, 38, 53
- Bunch Bucket, 13, 32, 38, 53, 66
- CERCLA, 9, 10
- City Limits, 13, 38, 53
- Clean Water Act, 16, 25, 63, 84, 288, 310
- CTUIR, 24
- Cultural Resources, 28
- CWA, 97
- East Ten Cent Creek, 13, 32, 34, 39, 53, 62
- Eddy Shipman, 9, 10, 13, 40, 53, 65
- Endangered Species Act, 311
- Environmental Protection Agency, 314
- Fire, 34, 62, 206
- floodplain, 87, 127
- floodplains, 87, 127
- fords, 34, 42, 48, 54, 57, 62, 65, 68
- Grubsteak, 13, 33, 41, 53
- Hopeful, 4, 13, 33, 34, 41, 53, 64, 66
- Hopeful 1, 4, 13, 33, 41, 53, 66
- Hopeful 2&3, 13, 33, 34, 42
- INFISH, 57, 113
- Issue, 25, 26
- L&H, 13, 33, 43, 53, 66
- L&H Placer, 13, 66
- Lightning Creek, 13, 27, 33, 44, 45, 48, 54, 64, 67
- Little Cross 1, 13, 33, 44
- Lucky Strike, 13, 33, 45, 54, 67
- Lynx, 312
- Make it, 13, 45
- Management Area, 240
- Management Areas, 19, 20, 241, 242
- Monitoring, 30, 49, 56, 58, 59, 62, 67, 68
- Muffin, 13, 33, 45, 54
- Muffin Placer, 13
- North Fork Placer, 113
- Noxious weeds, 28
- ODEQ, 62
- OHV, 239
- Old Eric, 33, 46, 54
- Old Eric 1&2, 13, 33, 54
- Olive Tone, 13, 33, 46, 54, 65
- PACFISH, 17, 18, 56, 63
- Purpose and Need for Action, 10
- Redband trout, 10
- road density, 239, 240, 244, 248
- Rose Bud, 33, 47
- Rose Bud 1-4, 33
- Rosebud 1-4, 13, 54, 65
- Royal White, 13, 33, 47, 54, 66
- Ruby Group, 13, 33, 34, 48, 54, 62, 65, 67
- Sediment, 25, 56, 84, 287
- Sensitive Species, 10
- suction dredging, 34, 56, 58, 63, 69
- Sunshine Group, 13
- Sunshine/ McWillis, 49
- Temperature, 56, 84
- Tetra Alpha, 13, 33, 34, 49, 50, 55, 62, 65, 68
- Tetra Alpha Mill & Lode, 13
- Tetra Alpha Placer, 13, 33, 34, 55, 62, 65, 68
- TMDL/WQP, 14
- TMP, 246, 248
- Transportation System, 233, 239
- Travel Management Plan, 246, 248
- Troy D, 13, 33, 50
- water quality, 87, 239, 247
- Water Quality, 11, 24, 25, 31, 56, 84, 309
- Water Rights, 16
- Yellow Gold, 13, 33, 51, 55, 66
- Yellow Jacket, 13, 33, 51, 55
- Yellow Jacket 1, 2, 3, 13

This page intentionally left blank.

References

- Aikens, C. Melvin. 1993. *Archaeology of Oregon*. Bureau of Land Management. Portland, Oregon.
- Alt, David and Donald Hyndman. 1995. *Northwest Exposures: a Geologic Story of the Northwest*. Mountain Press Publishing Company. Missoula, Montana.
- Anastasio, Angelo. 1972. The Southern Plateau: An Ecological Analysis of Intergroup Relations. *Northwest Anthropological Research Notes*. Volume 6(2): 109-200.
- Andrus, Patrick W., Rebecca H. Shrimpton. 2002. National Register Bulletin: How to Apply the National Register Criteria for Evaluation. USDI National Park Service. Washington, DC.
- Bishop, Ellen M. 2003. *In Search of Ancient Oregon*. Timber Press. Portland, Oregon.
- Bjornstad, Bruce. 2006. *On the Trail of the Ice Age Floods*. Keokee Books. Sandpoint, Idaho.
- Black, S.H.; Lauvray, L. 2005. Fact sheet for the Johnson's hairstreak (*Callophrys johnsoni*). Available at: www.fs.fed.us/r6/sfpnw/issssp/documents/planning-docs. Interagency Special Status/Sensitive Species Program.
- Black, S.H.; Lauvray, L.; Jepsen, S. 2007. Fact sheet for the Yuma skipper (*Ochlodes yuma*). Available at: www.fs.fed.us/r6/sfpnw/issssp/documents/planning-docs. Interagency Special Status/Sensitive Species Program.
- Bradley, B.A., Oppenheimer, M., & Wilcove, D.S. 2009. Climate change and plant invasions: restoration opportunities ahead? *Global Change Biology*, 15, 1511-1521.
- Brooks, Howard C. and Len Ramp. 1968. Bulletin 61: Gold and Silver in Oregon. State of Oregon Department of Geology and Mineral Industries, Portland, OR.
- Bull, E.; Hayes, M. 2001. Post-breeding season movements of Columbia spotted frogs (*Rana luteiventris*) in Northeastern Oregon. *Western North American Naturalist* 61(1): 119–123.
- Bull, E. 2005. Ecology of the Columbia spotted frog in northeastern Oregon. General Technical Report PNW-GTR-640, USDA Forest Service Pacific Northwest Research Station, Portland, OR. 46 p.
- Burkhardt, Barry; Holm, Melody R. March 2003. Multiple Use of National Forest System Lands – Is Minerals Part of the Mix?
- Carson, Robert and Kevin Pogue. 1996. *Flood Basalts and Glacier Floods*. Washington State Department of Natural Resources, Division of Geology and Earth Resources. Olympia, Washington.
- Center for Columbia River History. 2010. Nez Perce Treaty 1855. Electronic Document. <http://www.ccrh.org/comm/river/treaties/nezperce.htm>. Accessed 2010.
- Chalfant, S.F. 1974. *Nez Perce Indians: Aboriginal Territory of the Nez Perce Indians*. Garland, New York New York.

- Chappel, Jill A. 1995. Granite Mining District: Historic Overview and Management Plan, Volume I. On file at Wallowa-Whitman National Forest, Baker City, Oregon.
- Columbia University. 1959. "The Socio-Political Organization and Land Use Patterns of the Umatilla, Walla Walla, and Cayuse Indians." Master's thesis, Faculty of Political Science, New York.
- Confederated Tribes of the Umatilla Indian Reservation. 2011. Our History and Culture. Electronic Document. <http://www.umatilla.nsn.us>. Accessed August 3, 2011.
- Confederated Tribes of the Umatilla Indian Reservation Cultural Resources Protection Program. NoDate.
Ethnographic Information. Information sheet on file at Wallowa-Whitman National Forest. La Grande, Oregon.
- Conservation and Recovery Plan for Oregon Steelhead Populations in the Middle Columbia River Steelhead Distinct Population Segment. Carmichael R.W., and B.J Taylor. Oregon Department of Fish and Wildlife (ODFW). 2009.
- Corkran, C.C.; Thoms, C. 2006. Amphibians of Oregon, Washington and British Columbia: A field identification guide. Lone Pine Publications, Edmonton, Alta, Canada. 175 p.
- Darrach, M.E. 2011. Biological Evaluation of Botanical Resources, Granite Mining EIS Umatilla and Wallowa-Whitman National Forests 15p.
- Darrach, M.E., D.H. Wagner 2011. *Lomatium pastoralis* (Apiaceae), a new narrow endemic from northeast Oregon. J. Bot. Res. Inst. Texas 5:427-435.
- Darrach, M.E. and C.E. Hinchliff. 2014. *Lomatium tarantuloides* (Apiaceae), a new narrowly endemic species from northeast.
- Department of Geology and Mineral Industries. 1941. "Bulletin No. 14-B: Northeastern Oregon-West Half." State of Oregon, Portland, OR.
- Duncan, N. 2008. Fact sheet for the fir pinwheel (*Radiodiscus abietum*). Available at: www.fs.fed.us/r6/sfpnw/issssp/documents/planning-docs. Interagency Special Status/Sensitive Species Program.
- Evans, E.; Thorp, R.; Jepsen, S.; Black, S. 2012. Western bumble bee (*Bombus occidentalis*). On-line data website. The Xerces Society for Invertebrate Conservation, Portland, Oregon. Accessed at: www.xerces.org.
- Ezzeddine, M.; Matter, S. 2008. Nectar flower use and electivity by butterflies in sub-alpine meadows. Journal of the Lepidopterists' Society 62(3): 138–142.
- Fellers, G.M.; Drost, C.A. 1993. Disappearance of the Cascades frog *Rana cascadae* at the southern end of its range, California, USA. Biological Conservation 65: 177–181.

- Foltz, S. 2009. Fact sheet for the Intermountain sulphur (*Colias christina pseudochristina*). Available at: www.fs.fed.us/r6/sfpnw/issssp/documents/planning-docs. Interagency Special Status/Sensitive Species Program.
- Franklin, Jerry F. and C.T. Dyrness. 1988. Natural Vegetation of Oregon and Washington. Oregon State University Press, Corvallis.
- Frest, T. J., and E. J. Johannes. 1995. Interior Columbia Basin mollusk species of special concern. Final report: Interior Columbia Basin Ecosystem Management Project, Walla Walla, WA. Deixis Consultants, Seattle, WA. Contract #43-0E00-4-9112. 274 pp. plus appendices.
- Foulger, G.R. 2010. *Plates vs. Plumes, A Geological Controversy*. Wiley-Blackwell. Boston, Massachusetts.
- Giroux, Kathryn A. Conflicts on the Range: The Management of Multiple Uses on Rangelands.
- Griffith, J. S. and Andrews, D. A. (1981). Effects of a small suction dredge on fishes and aquatic invertebrates in Idaho streams. North American Journal of Fisheries Management, 1, 21-28.
- Hankin, D. G., and G. H. Reeves. 1988. Estimating total fish abundance and total habitat area in small streams based on visual estimation methods. Can. J. Fish. Aquat. Sci. 45: 834-844.
- Harvey B.C. 1986. Effects of Suction Gold Dredging on Fish and Invertebrates in Two California Streams. North American Journal of Fisheries Management 6:401-409.
- Harvey B.C. and T.E. Lisle. 1998. Effects of Suction Dredging on Streams: a Review and an Evaluation and Strategy. Fisheries 23(8):8-17.
- Harvey B.C. and T.E. Lisle. 1999. Scour of Chinook Salmon Redds on Suction Dredge Tailings. North American Journal of Fisheries Management 19:613-617.
- Harvey, B. C. (1986). Effects of suction gold dredging on fish and invertebrates in two California streams.
- Harvey, B. C. and Lisle, T. E. (1998). Effects of suction dredging on streams: a review and an evaluation strategy. North American Journal of Fisheries Management, 6, 401-409.
- Harvey, B. C. and Lisle, T. E. (1999). Scour of Chinook Salmon redds on suction dredge tailings. North American Journal of Fisheries Management, 19, 613-617.
- Hawley, Brooks. 1977. Gold Dredging in Sumpter Valley. Baker Printing and Lithography, Baker City, OR.
- Head, S. Conrade. 1987. Exploring Northeastern Oregon Part I: The Early Gold Era. La Grande, OR.
- Hellman, J.J., Byers, J.E., Bierwagen, B.G., & Dukes, J.S. 2008. Five potential consequences of climate change for invasive species. Conservation Biology, 22(3), 534-543.
- Henley, W. F., M. A. Patterson, R. J. Neves & A. Dennis Lemly 2000 Effects of Sedimentation and Turbidity on Lotic Food Webs: A Concise Review for Natural Resource Managers Reviews in Fisheries Science Volume 8, Issue 2, pages 125-139

- Hobbs, R.J. & Huenneke, L.F. 1992. Disturbance, diversity, and invasion: implications for conservation. *Conservation Biology*, 6(3), 324-337.
- Horr, David Agee, editor. 1974. "Ethnological Report on the Umatilla, Walla Walla and Cayuse Indians Relative to Socio-Political Organization and Land Use." In *Oregon Indians II*, American Indian Ethnohistory Series, Garland Publishing Company, New York.
- Horr, D.A. (editor). 1974. *Nez Perce Indians: Indian Claims Commission Findings*. Garland, Newark, New Jersey.
- Hudson, Lorelea, Gary G. Ayers, George F. Gauzza, Joseph Randolph. 1978. *Cultural Resource Overview of the Malheur, Umatilla, and Wallowa-Whitman National Forests, Northeast Oregon/Southeast Washington*. Volume II, Wallowa-Whitman National Forest. Cultural Resource Consultants, Inc. Sandpoint, Idaho.
- Ingles, L.G. 1949. Groundwater and snow as factors affecting the seasonal distribution of pocket gophers, *Thomomys monticola*: *J. of Mammology* 30(4): 343-350.
- Jacob, Gerald R., and Schreyer, Richard. Fourth Quarter 1980. Conflict in Outdoor Recreation: A Theoretical Perspective, *Journal of Leisure Research*.
- Jaehnig, Manfred E. W. 1990. The Old Granite to Sumpter Electric Power Line Evaluation and Cultural Resource Inventory Survey and Reroute Reports, Baker and Grant Counties, Oregon. Mount Emily Archaeological Services, La Grande, OR.
- Johnson, A. (2013). Email from Allison Johnson, Umatilla National Forest fisheries biologist, dated May 1, 2013 with information from Beth Moore of Oregon Department of Environmental Quality.
- Jones, Krista L., Geoffrey C. Poole, Eric J. Quaempts, Scott O'Daniel, Tim Beechie. 2008. *Umatilla River Vision: Hydrology, Connectivity, Aquatic Biota, Riparian Vegetation, Geomorphology*. Manuscript on file. Wallowa-Whitman National Forest. La Grande, Oregon.
- Keller, E. A. (1971). Areal sorting of bed-load material: the hypothesis of velocity reversal. *Geological Society of America Bulletin* 82:753-756 as cited in: Harvey, B. C. and Lisle, T. E. (1998). Effects of suction dredging on streams: a review and an evaluation strategy. *North American Journal of Fisheries Management*, 6, 401-409.
- Kennedy, R. (1997). Road Maintenance Frequency vs. Sediment Production. In *FS Engineering Field Notes*, December, pp. 11-15.
- Koch, George S. 1959. "Bulletin No. 49: Lode Mines of the Central Part of the Granite Mining District, Grant County, Oregon." State of Oregon, Department of Geology and Mineral Industries, Portland, OR.
- Koehler, G. M.; Brittell, J.D. 1990. Managing spruce-fir habitat for lynx and snowshoe hares. *Journal of Forestry* 88: 10-14.
- Lane, Robert B. and Barbara Lane. 1979. Traditional Fisheries of the Walla Walla, Cayuse,

- and Umatilla. Report 3-0002 on file in Confederated Tribes of the Umatilla Indian Reservation Cultural Resource Protection Program Archives, Mission, OR.
- Leonard, W.P.; Brown, H.A.; Jones, L.L.C.; [and others]. 1993. Amphibians of Washington and Oregon. Seattle Audubon Society. 168 pp.
- Lindgren, Waldemar. 1901. "The Gold Belt of the Blue Mountains of Oregon," United States Geological Survey, 22nd Annual Report, Washington, D.C.
- Litaor, M.I., M. Williams, T.R. Seastedt. 2008. Topographic controls on snow distribution, soil moisture, and species diversity of herbaceous alpine vegetation, Niwot Ridge, Colorado: J. of Geophysical Research 113: G02008, doi:10.1029/2007JG000419.
- Lockwood J.L., Cassey, P., & Blackburn, T. 2005. The role of propagule pressure in explaining species invasions. Trends in Ecology and Evolution, 20(5), 223-228.
- Lorain, S.H. 1938. "Information Circular: Gold Mining and Milling in Northeastern Oregon." United States Department of the Interior, Bureau of Mines, Washington, D.C.
- Maley, Terry. 1996. Mineral Law, Sixth Edition, Mineral Land Publications.
- Marshall, A.G. 1977. *Nez Perce Social Groups: An Ecological Interpretation*. Unpublished Ph.D. dissertation, Washington State University, Pullman, Washington.
- Marshall, D.B. 2003. White-headed woodpecker (*Picoides albolarvatus*). In: Marshall, D.B.; Hunter, M.G.; Contreras, A.L. Birds of Oregon: A general reference. Oregon State University Press, Corvallis. p. 364–367.
- Marvin-DiPasquale, M.J. Agee, E. Kakouros, L.H. Kieu, J.A. Fleck, and C.N. Alpers. 2011. The Effects of Sediment and Mercury Mobilization in the South Yuba River and Humbug Creek Confluence Area, Nevada County, California: Concentrations, Speciation and Environmental Fate. Part 2: laboratory Experiments. U.S. Geological Survey Report 2010-1325B.
- McKinney S.P., J. O'Connor, C.K. Overton, K. MacDonald, K. Tu, S. Whitwell. 1996. A Characterization of Inventoried Streams in the Columbia River Basin. Aqua-Talk USDA 11:1-119.
- McLeay D.J., I.K. Birtwell, G.F. Hartman, and G.L. Ennis. 1986. Response of Arctic Grayling (*Thymallus arcticus*) to Acute and Prolonged Exposure to Yukon Placer Mining Sediment. Canadian Journal of Fisheries and Aquatic Sciences 44:658-673.
- Merriam, K.E., Keeley, J.E., & Beyers, J.L. 2006. Fuel breaks affect nonnative species abundance in Californian plant communities. Ecological Applications, 16(2), 515-527.
- Minthorn, Armand. 1994. "Mits Qooi Nux Sa Kin Na Noon Im Watus Pa: A Partial Traditional Use Area Inventory of the Umatilla National Forest and Wallowa Whitman National Forest." Report prepared for Umatilla National Forest, Pendleton, OR.
- Morris, R.L.; Tanner, W.W. 1969. The ecology of the western spotted frog (*Rana pretiosa*) Baird and Girard: A life history study. Great Basin Naturalist 29: 45–81. In: Larsen, E.M.; ed.

- Management recommendations for Washington's priority species, Volume III: Amphibians and Reptiles. Washington Department of Fish and Wildlife, Olympia.
- National Marine Fisheries Service, 1996. Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale. Prepared by the National Marine Fisheries Service Environmental and Technical Services Division Habitat Conservation Branch. 33p.
- NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life. Version 7.1 NatureServe, Arlington, VA. Available <http://www.natureserve.org>. (Accessed: July 3, 2014).
- NatureServe. 2012. On-line data website. Accessed at: www.natureserve.org.
- Neddeau E.J., A.K. Smith, J. Stone, and S. Jepsen. 2009. Freshwater Mussels of the Pacific Northwest Second Edition. The Xerces Society, Portland OR.
- Neitzel D.A., T.J. Frest. 1990. Survey of Columbia River Basin Streams for Columbia Pebblesnail and Shortface Lanx. Fisheries. Vol. 15(2): 2-3.
- Nelson R.L., M.L. McHenry, and W.S. Platts. 1991. Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication 19: 425-457.
- Nez Perce Tribe. 2010. Official History. Electronic Document. <http://nezperce.org>. Accessed June 30, 2008.
- Oregon Biodiversity Information Center. 2010. Rare, threatened and endangered species of Oregon. Available online: <http://orbic.pdu.edu>.
- Oregon Bureau of Mines and Geology. 1916. "Alphabetical List of Mines, Mining Companies, and Prospects in Oregon," The Mineral Resources of Oregon 2(4):7-241.
- Oregon Chapter of the American Fisheries Society 2013. Effects of Suction Dredge Mining on Oregon Fishes and Aquatic Habitats. 5 p.
- Oregon Department of Environmental Quality (ODEQ) 2010. Total Maximum Daily Load John Day Basin: <http://www.deq.state.or.us/wq/tmdls/tmdls.htm> (accessed Feb 2012)
- Oregon Department of Environmental Quality. www.deq.state.or.us/WQ/wqpermit/mining.htm, Somer, W. L. and Hassler, T. J. (1992). Effects of suction-dredge gold mining on benthic invertebrates in a northern California stream. North American Journal of Fisheries Management, 12, 244-252.
- Oregon Metal and Mines Handbook. 1939. "Bulletin No. 14-A: Northeastern Oregon—East Half." State of Oregon, Department of Geology and Mineral Industries, Portland, OR.
- Orr, Elizabeth L. and William N. Orr. 1996. Geology of the Pacific Northwest. McGraw Hill Companies, Inc. New York.
- Orr, Elizabeth L, William N. Orr, and Ewart M. Baldwin. 1992. *Geology of Oregon*.

- Fourth Edition. Kendall/Hunt Publishing, Dubuque, Iowa.
- Pardee, J.T. and D.F. Hewett. 1914. Geology and Mineral Resources of the Sumpter Quadrangle. October Issue of the Mineral Resources of Oregon, Published by The Oregon Bureau of Mines and Geology (V1, no. 6, page 9)
- Parker, Patricia, Thomas F. King. 1998. *National Register Bulletin: Guidelines for Evaluating and Documenting Traditional Cultural Properties*. USDI National Park Service. Washington, DC.
- Pierson, E.D.; Wackenhut, M.C.; Altenbach, J.S.; [and others]. 1999. Species conservation assessment and strategy for Townsend's big-eared bat (*Corynorhinus townsendii townsendii* and *Corynorhinus townsendii pallescens*). Idaho Conservation Effort, Idaho Department of Fish and Game, Boise.
- Popek, Gary M. 1993. Fremont Planning Area: A Heritage Resource Inventory Report. USDA Forest Service, Pacific Northwest Region, Umatilla National Forest, North Fork John Day Ranger District, Pendleton, OR.
- Ray, Verne F. 1938. "Tribal Distribution in Eastern Oregon and Adjacent Regions." *American Anthropologist* 40(3):384-395.
- Reagan, Michael J. 1984. *Wallowa-Whitman National Forest Interim Inventory Design*. Manuscript on file. Wallowa-Whitman National Forest. Baker City, Oregon.
- Rosgen, D. L., 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, Colorado.
- Ruby, Robert H. 1975. *The Cayuse Indians, Imperial Tribesman of Old Oregon*. Vol. 12. University of Oklahoma Press. Norman, Oklahoma.
- Somer W.L., and T.J. Hassler. 1992. Effects of Suction-Dredge Gold Mining on Benthic Invertebrates in a Northern California Stream. *North American Journal of Fisheries Management* 12:244-252.
- Sousa, W.P. 1984. The role of disturbance in natural communities. *Annu. Rev. Ecol. Syst.*, 15, 353-391
- Spence, B., G. Lomnický, R. Hughes and R. Novitzki. 1996. An Ecosystem Approach to Salmonid Conservation. Funded jointly by the U.S. EPA, U.S. Fish and Wildlife Service and National Marine Fisheries Service. TR-4501-96-6057. Man Tech Environmental Research Services Corp., Corvallis, OR.
- State of Oregon, Department of Geology and Mineral Industries Bulletin No 49, Lode Mines of the Central Part of the Granite Mining District, Grant County, Oregon. Introduction by George S. Koch, Jr. Assistant Professor of Geology, Oregon State College.
- State of Oregon, Department of Geology and Mineral Industries Bulletin No 14-B, Grant, Morrow and Umatilla Counties, Oregon Metal Mines Handbook by Staff, 1941 (page 40).
- Steeves, Laban Richard. 1984. Chinese Gold Miners of Northeastern Oregon, 1862-1900. Master's thesis, University of Oregon, Eugene, OR.

- Stern, Theodore, n.d. Cayuse, Walla Walla, and Umatilla. In *Handbook of North American Indians*, Volume 12, Plateau, edited by D.E. Walker. Smithsonian Institution, Washington D.C.
- Steube, M.M., D.C. Anderson 1985. Nutritional ecology of a fossorial herbivore: protein, N and energy value of winter caches made by the northern pocket gopher *Thomomys talpoides*: *Canadian Jour. of Zoology* 63(5) 1101-1105.
- Sturtevant, Stuart, editor. 1998. *Handbook of North American Indians*, Volume 12, "Plateau." Smithsonian Institution, Washington, D.C.
- Sturtevant, William C. 1986. *Handbook of North American Indians*. Vol. 11. Smithsonian Institution, Washington, DC.
- Suphan, Robert J. 1974. *Oregon Indians II*, Ethnological Report on the Wasco and Tenino Indians and Ethnological Report on the Umatilla, Walla Walla, and Cayuse Indians. Garland Publishing, Inc., New York, New York.
- Sutherland, Steve; Zouhar, Kristin; Smith, Jane Kapler; Brooks, Matthew L. 2008. Wildland fire in ecosystems: fire and nonnative invasive plants. Gen. Tech. Rep. RMRS-GTR-42-vol. 6. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 355 p.
- Suphan, Robert J., n.d. "Ethnological Report on the Umatilla, Walla Walla, and Cayuse Indians Relative to Socio-Political Organization and Land Use." Defendant's Exhibit, Indians Claims Commission. Docket No. 264.
- Swartley, Arthur M. 1914. "Ore Deposits of Northeastern Oregon." In *Mineral Resources of Oregon* 1(8):1- 229.
- Swindell, Edward G. 1942. "Report on the Source, Nature, and Extent of the Fishing, Hunting, and Miscellaneous Related Rights of Certain Indian Tribes in Washington and Oregon." U.S. Office of Indian Affairs, Los Angeles. Reprinted by Bureau of Indian Affairs, Branch of Land Services. Portland, 1975.
- Tabor, James Waucop. 1988. *Granite and Gold: The Story of Oregon's Smallest City*, Record-Courier Printers, Baker, OR.
- Thomas V.G. 1985. Experimentally Determined Impacts of a Small, Suction Gold Dredge on a Montana Stream 5:480-488.
- USDA Forest Service, 1990-A. Umatilla National Forest Land and Resource Management Plan, EIS and Record of Decision. USDA Forest Service, Pacific Northwest Region, Umatilla National Forest, Pendleton, OR. 1990.
<http://www.fs.usda.gov/main/umatilla/landmanagement/planning> -
- USDA Forest Service, 1990-B. Wallowa-Whitman National Forest Land and Resource Management Plan, EIS and Record of Decision. USDA Forest Service, Pacific Northwest Region, Wallowa-Whitman National Forest, Baker City, OR. April 1990.
<http://www.fs.usda.gov/main/wallowa-whitman/landmanagement/planning>
- USDA Forest Service, 2005. Pacific Northwest Region Invasive Plant Program Record of Decision. USDA Forest Service, Pacific Northwest Region, Portland, OR. October 2005.

- USDA Forest Service, 2010. Wallowa-Whitman National Forest Invasive Plants Treatment Project Record of Decision. USDA Forest Service, Pacific Northwest Region, Wallowa-Whitman National Forest, Baker City, Or. May 2010.
- USDA Forest Service. 2012. General Water Quality Best Management Practices. Pacific Northwest Region.
- USDA Forest Service. 1994. Section 7 Fish Habitat Monitoring Protocol for the Upper Columbia River Basin.
- USDA Forest Service. Clear Creek and Bull Run Watershed Restoration Action Plans (WRAPS) <http://apps.fs.usda.gov/WCFmapviewer/>
- USDA Forest Service, Forest Service Manual 2380.15 - Minerals Management, Forest Service Manual 2380 – Landscape Management
- USDA Forest Service. December 1995. Agricultural Handbook Number 701, Landscape Aesthetics, A handbook for Scenery Management.
- USDA Forest Service, Pacific Northwest Region, Wallowa-Whitman National Forest, Elkhorn Drive, National Forest Scenic Byway Management Plan
- USDA Forest Service, Forest Service Handbook - Land Management Planning Handbook, 1909.12
- USDA and USDI. 1995. Decision notice/decision record finding no significant impact: environmental assessment for the interim strategies for managing anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho and portions of California (PACFISH).
- USDA Forest Service (FS), USDC NOAA National Marine Fisheries Service (NMFS), USDI Bureau of Land Management (BLM) and USDI Fish and Wildlife Service (FWS). 1999. Streamlined Consultation Procedures for Section 7 of the Endangered Species Act.
- USDA Forest Service. 1999. Final environmental impact statement — record of decision and summary: Herger-Feinstein Quincy Library Group Forest Recovery Act. USDA Forest Service Lassen, Plumas, Tahoe National Forests, Quincy, CA.
- USDA Forest Service Region Six Letter of Direction, Update of the Regional Forester's Special Status Species List, December 9, 2011
- USDI Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS). 1998. Endangered Species Act Consultation Handbook.
- USDA Natural Resources Conservation Service. 2011. Web Soil Survey. Electronic Database. websoilsurvey.nrcs.usda.gov. Accessed 2010.
- United States Geologic Survey (USGS). 2011. Geologic Provinces of the United States: Columbia Plateau Province. Electronic Document. <http://geomaps.wr.usgs.gov/parks/province/columplat.html>. Accessed August 3, 2011.
- Walker, George and Norman S. MacLeod. 1991. "Geologic Map of Oregon." United States

Geologic Survey, Denver.

Wegars, Priscilla. 1995 "The Ah Hee Diggings: Final Report of Archaeological Investigations at OR-GR- 16, the Granite, Oregon "Chinese Walls" Site, 1992 Through 1994." University of Idaho Anthropological Reports, No. 97. Alfred W. Bowers Laboratory of Anthropology, University of Idaho, Moscow, ID

Western Bat Working Group. 2005a. Species account: Spotted bat. On-line:
www.wbwg.org/speciesinfo/species_accounts/.

Western Bat Working Group. 2005b. Species account: Fringed myotis. On-line:
www.wbwg.org/speciesinfo/species_accounts/.

Wisdom, M. J.; Holthausen, R.S.; Wales, B.C.; [and others]. 2000. Source habitats for terrestrial vertebrates of focus in the Interior Columbia Basin: Broad-scale trends and management implications. General Technical Report PNW-GTR-485, USDA Forest Service Pacific Northwest Research Station, Portland, OR.

30 USC 612(b), Multiple Use Mining Act of 1955 July 23, 1955 (Ch. 375, 69 Stat. 367; 30 U.S.C. 601, 603, 611 to 615)

1970 Mining & Minerals Policy Act (84 Stat. 1876; 30 U.S.C. 21a)